



DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R2–ES–2021–0098; FF09E21000 FXES1111090FEDR 223]

RIN 1018–BF25

Endangered and Threatened Wildlife and Plants; Threatened Species Status with Section 4(d) Rule for Cactus Ferruginous Pygmy-owl

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), propose to list the cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*), a subspecies found in Mexico, southern Arizona, and southern Texas, as a threatened species under the Endangered Species Act of 1973, as amended (Act). This determination also serves as our 12-month finding on a petition to list the cactus ferruginous pygmy-owl. After a review of the best available scientific and commercial information, we find that listing the subspecies is warranted. Accordingly, we propose to list the cactus ferruginous pygmy-owl as a threatened species with a rule issued under section 4(d) of the Act (“4(d) rule”). If we finalize this rule as proposed, it would add this subspecies to the List of Endangered and Threatened Wildlife and extend the Act’s protections to the subspecies. The finalization of this rule as proposed would include the issuance of a 4(d) rule. Designation of critical habitat was found to be prudent, but not determinable at this time. We also are notifying the public that we have scheduled an informational meeting followed by a public hearing on the proposed rule.

DATES: We will accept comments received or postmarked on or before [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL

REGISTER]. Comments submitted electronically using the Federal eRulemaking Portal (see **ADDRESSES**, below) must be received by 11:59 p.m. Eastern Time on the closing date.

Public informational meeting and public hearing: We will hold a public informational session from 4:00 p.m. to 5:30 p.m., Mountain Standard Time, followed by a public hearing from 6:00 p.m. to 7:30 p.m., Mountain Standard Time, on January 25, 2022.

ADDRESSES: You may submit comments by one of the following methods:

(1) *Electronically:* Go to the Federal eRulemaking Portal:

<http://www.regulations.gov>. In the Search box, enter the docket number or RIN for this rulemaking (presented above in the document headings). For best results, do not copy and paste either number; instead, type the docket number or RIN into the Search box using hyphens. Then, click on the Search button. On the resulting page, in the panel on the left side of the screen, under the Document Type heading, check the Proposed Rule box to locate this document. You may submit a comment by clicking on “Comment.”

(2) *By hard copy:* Submit by U.S. mail to: Public Comments Processing, Attn: FWS–R2–ES–2021–0098, U.S. Fish and Wildlife Service, MS: PRB/3W, 5275 Leesburg Pike, Falls Church, VA 22041–3803.

We request that you send comments only by the methods described above. We will post all comments on <http://www.regulations.gov>. This generally means that we will post any personal information you provide us (see **Information Requested**, below, for more information).

Public informational meetings and public hearings: The public informational meetings and the public hearings will be held virtually using the Zoom platform. See **Public Hearing**, below, for more information.

FOR FURTHER INFORMATION CONTACT: Jeff Humphrey, Field Supervisor, U.S. Fish and Wildlife Service, Arizona Ecological Services Field Office, 9828 N. 31st

Ave., Phoenix, AZ, 85051; telephone 602–242–0210. Persons who use a telecommunications device for the deaf (TDD) may call the Federal Relay Service at 800–877–8339.

SUPPLEMENTARY INFORMATION:

Executive Summary

Why we need to publish a rule. Under the Act, a species warrants listing if it meets the definition of an endangered species (in danger of extinction throughout all or a significant portion of its range) or a threatened species (likely to become endangered in the foreseeable future throughout all or a significant portion of its range). We have determined that the cactus ferruginous pygmy-owl meets the definition of a threatened species; therefore, we are proposing to list it as such. To the maximum extent prudent and determinable, we must designate critical habitat for any species that we determine to be an endangered or threatened species under the Act. Listing a species as an endangered or threatened species and designation of critical habitat can be completed only by issuing a rule.

What this document does. We propose to list the cactus ferruginous pygmy-owl as a threatened species under the Act with a rule issued under section 4(d) of the Act. As explained in this document, we find that the designation of critical habitat for the cactus ferruginous pygmy-owl is not determinable at this time.

The basis for our action. Under the Act, we may determine that a species is an endangered or threatened species because of any of five factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence.

We have determined that threats to the cactus ferruginous pygmy-owl include: (1) Habitat loss and fragmentation from urbanization, invasive species, and agricultural or forest production; and (2) climate change (effects from future changes in climate) and climate conditions (effects from current and past climate), resulting in hotter, more arid conditions throughout much of the subspecies' geographic range. The proposed 4(d) rule would generally prohibit the same activities as prohibited for an endangered species but would allow exemptions for specific types of education and outreach activities already permitted under a Migratory Bird Treaty Act permit and habitat restoration and enhancement activities that improve habitat conditions for the cactus ferruginous pygmy-owl.

Section 4(a)(3) of the Act requires the Secretary of the Interior (Secretary) to designate critical habitat concurrent with listing to the maximum extent prudent and determinable. As explained later in this proposed rule, we find that the designation of critical habitat for the cactus ferruginous pygmy-owl is not determinable at this time.

Information Requested

We intend that any final action resulting from this proposed rule will be based on the best scientific and commercial data available and be as accurate and as effective as possible. Therefore, we request comments or information from other governmental agencies, Native American Tribes, the scientific community, industry, or any other interested parties concerning this proposed rule.

We particularly seek comments concerning:

(1) The subspecies' biology, range, and population trends, including:

(a) Biological or ecological requirements of the subspecies, including habitat requirements for feeding, breeding, and sheltering;

(b) Genetics and taxonomy;

(c) Historical and current range, including distribution patterns;

(d) Historical and current population levels, and current and projected trends; and

(e) Past and ongoing conservation measures for the subspecies, its habitat, or both, and the effectiveness of such measures.

(2) Factors that may affect the continued existence of the subspecies, which may include habitat modification or destruction, overutilization, disease, predation, the inadequacy of existing regulatory mechanisms, or other natural or manmade factors. We are also seeking information indicating where threats are disproportionately affecting the cactus ferruginous pygmy-owl within specific portions of its geographical range.

(3) Biological, commercial trade, or other relevant data concerning any threats (or lack thereof) to this subspecies and existing regulations that may be addressing those threats.

(4) Additional information concerning the historical and current status, range, distribution, and population size of this subspecies, including the locations of any additional populations of this subspecies.

(5) Information on regulations that are necessary and advisable to provide for the conservation of the cactus ferruginous pygmy-owl and that the Service can consider in developing a 4(d) rule for the subspecies. In particular, we are seeking information concerning the extent to which we should include any of the section 9 prohibitions in the 4(d) rule or whether we should consider any additional exceptions from the prohibitions in the 4(d) rule. We encourage public and agency comments related to our consideration of using the State permitting process, if required, in the 4(d) rule as the basis of an exception to the prohibitions on take related to certain pygmy-owl survey and monitoring activities. We are also specifically seeking documentation of the effects and benefits of properly managed grazing on cactus ferruginous pygmy-owl habitat, as well as the threat of current and historical improper grazing in both the United States and Mexico.

(6) The reasons why we should or should not designate habitat as “critical habitat” under section 4 of the Act (16 U.S.C. 1531 *et seq.*), including information to inform the following factors that the regulations identify as reasons why designation of critical habitat may be not prudent:

(a) The species is threatened by taking or other human activity and identification of critical habitat can be expected to increase the degree of such threat to the species;

(b) The present or threatened destruction, modification, or curtailment of a species’ habitat or range is not a threat to the species, or threats to the species’ habitat stem solely from causes that cannot be addressed through management actions resulting from consultations under section 7(a)(2) of the Act;

(c) Areas within the jurisdiction of the United States provide no more than negligible conservation value, if any, for a species occurring primarily outside the jurisdiction of the United States; or

(d) No areas meet the definition of critical habitat.

(7) Specific information on:

(a) Demographic information for the cactus ferruginous pygmy-owl, including dispersal patterns, prey relationships, survival, reproduction, sources of mortality, updated occurrence records, and population trends;

(b) The amount and distribution of cactus ferruginous pygmy-owl habitat, including habitat connectivity, patch size, geographic range, and future climate change effects on the subspecies’ habitat;

(c) Which areas, that were occupied at the time of listing and that contain the physical or biological features essential to the conservation of the subspecies, should be included in the designation and why;

(d) Any additional areas occurring within the range of the species, [i.e., Yuma, Maricopa, Pinal, Pima, Santa Cruz, Cochise, Graham, Gila counties in Arizona and

Kleberg, Kenedy, Willacy, Cameron, Hidalgo, Brooks, Jim Wells, Duval, Jim Hogg, Starr, Zapata, and Webb counties in Texas], that should be included in the designation because they (1) are occupied at the time of listing and contain the physical or biological features that are essential to the conservation of the species and may require special management considerations, or (2) are unoccupied at the time of listing and are essential for the conservation of the species;

(e) Special management considerations or protection that may be needed in critical habitat areas, including managing for the potential effects of climate change; and

(f) Which areas, not occupied at the time of listing, are essential for the conservation of the subspecies. We particularly seek comments:

(i) Regarding whether occupied areas are adequate for the conservation of the subspecies; and

(ii) Providing specific information regarding whether or not unoccupied areas would, with reasonable certainty, contribute to the conservation of the subspecies and contain at least one physical or biological feature essential to the conservation of the species; and

(iii) Explaining whether or not unoccupied areas fall within the definition of “habitat” at 50 CFR 424.02 and why.

Please include sufficient information with your submission (such as scientific journal articles, research reports, survey results, maps, or other publications) to allow us to verify any scientific or commercial information you include.

Please note that submissions merely stating support for, or opposition to, the action under consideration without providing supporting information, although noted, will not be considered in making a determination, as section 4(b)(1)(A) of the Act directs that determinations as to whether any species is an endangered or a threatened species must be made “solely on the basis of the best scientific and commercial data available.”

You may submit your comments and materials concerning this proposed rule by one of the methods listed in **ADDRESSES**. We request that you send comments only by the methods described in **ADDRESSES**.

If you submit information via <http://www.regulations.gov>, your entire submission—including any personal identifying information—will be posted on the website. If your submission is made via a hardcopy that includes personal identifying information, you may request at the top of your document that we withhold this information from public review. However, we cannot guarantee that we will be able to do so. We will post all hardcopy submissions on <http://www.regulations.gov>.

Comments and materials we receive, as well as supporting documentation we used in preparing this proposed rule, will be available for public inspection on <http://www.regulations.gov>.

Because we will consider all comments and information we receive during the comment period, our final determinations may differ from this proposal. Based on any new information we receive (and any comments on that new information), we may conclude that the subspecies is endangered instead of threatened, or we may conclude that the subspecies does not warrant listing as either an endangered species or a threatened species. We may also conclude that the subspecies is not warranted for listing rangewide, but is warranted in one of the petitioned Distinct Population Segments (DPSs) (see **Previous Federal Actions**, below). In addition, we may change the parameters of the prohibitions or the exceptions to those prohibitions in the 4(d) rule if we conclude it is appropriate in light of comments and new information received. For example, we may expand the prohibitions to include prohibiting additional activities if we conclude that those additional activities are not compatible with conservation of the species. Conversely, we may establish additional exceptions to the prohibitions in the final rule if

we conclude that the activities would facilitate or are compatible with the conservation and recovery of the species.

Public Hearing

We have scheduled a public informational meeting and public hearing on this proposed rule to list the cactus ferruginous pygmy-owl as a threatened species. We will hold the public informational meeting and public hearing on the date and at the times listed above under Public informational meeting and public hearing in **DATES**. We are holding the public informational meeting and public hearing via the Zoom online video platform and via teleconference so that participants can attend remotely. For security purposes, registration is required. To listen and view the meeting and hearing via Zoom, listen to the meeting and hearing by telephone, or provide oral public comments at the public hearing by Zoom or telephone, you must register. For information on how to register, or if you encounter problems joining Zoom the day of the meeting, visit <https://www.fws.gov/southwest/>. Registrants will receive the Zoom link and the telephone number for the public informational meeting and public hearing. If applicable, interested members of the public not familiar with the Zoom platform should view the Zoom video tutorials (<https://support.zoom.us/hc/en-us/articles/206618765-Zoom-video-tutorials>) prior to the public informational meeting and public hearing. The public hearing will provide interested parties an opportunity to present verbal testimony (formal, oral comments) regarding this proposed rule. The public informational meeting will be an opportunity for dialogue with the Service. The public hearing is a forum for accepting formal verbal testimony. In the event there is a large attendance, the time allotted for oral statements may be limited. Therefore, anyone wishing to make an oral statement at the public hearing for the record is encouraged to provide a prepared written copy of their statement to us through the Federal eRulemaking Portal, or U.S. mail (see ADDRESSES, above). There are no limits on the length of written comments submitted to us. Anyone

wishing to make an oral statement at the public hearings must register before the hearing (<https://www.fws.gov/southwest/>). The use of a virtual public hearing is consistent with our regulations at 50 CFR 424.16(c)(3).

Reasonable Accommodation

The Service is committed to providing access to the public informational meeting and public hearing for all participants. Closed captioning will be available during the public informational meeting and public hearing. Further, a full audio and video recording and transcript of the public hearing will be posted online at <https://www.fws.gov/southwest/> after the hearing. Participants will also have access to live audio during the public informational meeting and public hearing via their telephone or computer speakers. Persons with disabilities requiring reasonable accommodations to participate in the meeting and/or hearing should contact the person listed under **FOR FURTHER INFORMATION CONTACT** at least 5 business days prior to the date of the meeting and hearing to help ensure availability. An accessible version of the Service's public informational meeting presentation will also be posted online at <https://www.fws.gov/southwest/> prior to the meeting and hearing (see **DATES**, above). See <https://www.fws.gov/southwest/> for more information about reasonable accommodation.

Previous Federal Actions

A thorough summary of previous Federal actions related to the pygmy-owl can be found in the March 10, 1997, final rule (62 FR 10730) to list the cactus ferruginous pygmy-owl in Arizona as endangered; the April 14, 2006, final rule (71 FR 19452) removing the listing promulgated in the March 10, 1997, final rule; the June 2, 2008, 90-day finding (73 FR 31418); and the October 5, 2011, 12-month finding on a petition to list (76 FR 61856).

On March 20, 2007, we received a petition dated March 15, 2007, from the Center for Biological Diversity and Defenders of Wildlife (CBD, DOW; petitioners) requesting that we list the cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*) (pygmy-owl) as an endangered or threatened species under the Act (CBD and DOW 2007, entire). The petitioners described three potentially listable entities of the pygmy-owl: (1) An Arizona DPS of the pygmy-owl; (2) a Sonoran Desert DPS of the pygmy-owl; and (3) the western subspecies of the pygmy-owl, which they identified as *Glaucidium ridgwayi cactorum*. On October 5, 2011, we published in the *Federal Register* (76 FR 61856) a 12-month finding on the petition to list the pygmy-owl as endangered or threatened. We found that *Glaucidium ridgwayi cactorum* was not a valid taxon and, therefore, not a listable entity under the Act. Additionally, using the currently accepted taxonomic classification of the pygmy-owl (*Glaucidium brasilianum cactorum*), we found that listing the pygmy-owl was not warranted throughout all or a significant portion of its range, including the petitioned and other potential DPS configurations.

In 2014, the Center for Biological Diversity and Defenders of Wildlife challenged our determination that listing the pygmy-owl was not warranted under the Act (*Ctr. For Biological Diversity v. Jewell*, 248 F. Supp. 3d 946). The challenge centered on whether we had correctly defined language in the Act authorizing listing of a species that is endangered or threatened in either “all or a significant portion of its range” (SPR). The plaintiffs challenged our final policy interpreting this SPR language (SPR Policy) and how it was applied in listing determinations. In its decision on March 28, 2017, the court reasoned that "if a portion of a species' range is 'significant' only 'if its contribution to the viability of the species is so important that, without that portion, the species would be in danger of extinction,' and the species is endangered or threatened in that portion (as would be required for listing), then the species is necessarily endangered or threatened overall" (248 F.Supp.3d at 959). The court thus found the SPR Policy invalid because it

defined “significant” in such a way as to limit the SPR language to situations in which it is unnecessary. The court vacated and remanded the definition of “significant” in the SPR Policy. The not-warranted finding for the cactus ferruginous pygmy-owl relied on a draft of this SPR Policy, which was slightly different than the final policy. The draft SPR Policy interpretation defined a range portion as “significant” “if its contribution to the viability of the species is so important that, without that portion, the species would be in danger of extinction [i.e., endangered]” (76 FR 76987, December 9, 2011; p. 77002). The court also found this interpretation of SPR impermissible by limiting the SPR language to situations in which it is unnecessary, and the court vacated our not-warranted finding for the pygmy-owl. On November 14, 2019, the parties to the lawsuit agreed that the Service would submit a 12-month finding to the *Federal Register* no later than August 5, 2021. On July 6, 2021, the court granted an extension to allow additional time to review new data provided by the Arizona Game and Fish Department. The new deadline requires that the Service submit the 12-month finding to the *Federal Register* no later than December 16, 2021. This document complies with the court’s deadline.

Distinct Population Segment Analysis

Regarding the petitioned DPSs in Arizona and the Sonoran Desert included in the 2007 petition, we reaffirm our October 5, 2011, 12-month finding (76 FR 61856). Specifically, we considered a DPS for the Sonoran Desert population of the pygmy-owl and concluded that this population does not meet the discreteness conditions of the Service’s policy regarding the Recognition of Distinct Vertebrate Population Segments Under the Endangered Species Act (61 FR 4722, February 7, 1996). We also considered a DPS for the Arizona population of the pygmy-owl and concluded that, while the discreteness criteria for the DPS were met, we could not show that this DPS was significant to the taxon as a whole. For information regarding our rationale, please see *Analysis of Potential Distinct Population Segments* in our previous 12-month finding (76

FR 61856, October 5, 2011, pp. 61885–61889). We will accept comments related to these DPS decisions during the public comment period on this proposed rule (see **DATES**, above).

Supporting Documents

A species status assessment (SSA) team prepared an SSA report for the cactus ferruginous pygmy-owl. The SSA team was composed of Service biologists, in consultation with other species experts. The SSA report represents a compilation of the best scientific and commercial data available concerning the status of the subspecies, including the impacts of past, present, and future factors (both negative and beneficial) affecting the subspecies. In accordance with our joint policy on peer review published in the *Federal Register* on July 1, 1994 (59 FR 34270), and our August 22, 2016, memorandum updating and clarifying the role of peer review of listing actions under the Act, we sought the expert opinions of five appropriate specialists regarding the SSA report. We received three responses. We also sent the SSA report to 13 partners, including Tribes and scientists with expertise in land management, pygmy-owl and raptor ecology, and climate science, for review. We received review from 11 partners, including State and Federal agencies, universities, and nonprofit organizations.

I. Proposed Listing Determination

Background

A thorough review of the taxonomy, life history, and ecology of the cactus ferruginous pygmy-owl is presented in the SSA report. We summarize this information here.

The cactus ferruginous pygmy-owl is a diurnal, nonmigratory subspecies of ferruginous pygmy-owl (*Glaucidium brasilianum*) and is found from central Arizona south to Michoacán, Mexico, in the west and from south Texas to Tamaulipas and Nuevo Leon, Mexico, in the east. Pygmy-owls eat a variety of prey including birds, insects,

lizards, and small mammals, with the relative importance of prey type varying throughout the year.

The pygmy-owl is a small bird, approximately 17 centimeters (cm) (6.7 inches (in)) long. Generally, male pygmy-owls average 58 grams (g) to 66 g (2.0 to 2.3 ounces (oz)) and females average 70 g to 75 g (2.4 to 2.6 oz). The pygmy-owl is reddish brown overall, with a cream-colored belly streaked with reddish brown. The crown is lightly streaked, and a pair of dark brown or black spots outlined in white occurs on the nape, suggesting eyes (Oberholser 1974, p. 451). The species lacks obvious ear tufts (Santillan et al. 2008, p. 154), and the eyes are yellow. The tail is relatively long for an owl and is reddish brown in color, with darker brown bars. Males have pale bands between the dark bars on the tail, while females have darker reddish bands between the dark bars.

Cactus ferruginous pygmy-owls are secondary cavity nesters, nesting in cavities of trees and columnar cacti, with nesting substrate varying throughout its range. Pygmy-owls can breed in their first year and typically mate for life, with both sexes breeding annually. Clutch size can vary from two to seven eggs with the female incubating the eggs for 28 days (Johnsgard 1988, p. 162; Proudfoot and Johnson 2000, p. 11). Fledglings disperse from their natal sites about 8 weeks after they fledge (Flesch and Steidl 2007, p. 36). Pygmy-owls live on average 3 to 5 years, but have been documented to live 7 to 9 years in the wild (Proudfoot 2009, pers. comm.) and 10 years in captivity (AGFD 2009, pers. comm.).

Pygmy-owls are found in a variety of vegetation communities, including Sonoran desertscrub and semidesert grasslands in Arizona and northern Sonora, thornscrub and dry deciduous forests in southern Sonora south to Michoacán, Tamaulipan brushland in northeastern Mexico, and live oak forest in Texas. At a finer scale, the pygmy-owl is a creature of edges found in semi-open areas of thorny scrub and woodlands in association with giant cacti and in scattered patches of woodlands in open landscapes, such as dry

deciduous forests and riparian communities along ephemeral, intermittent, and perennial drainages (König et al. 1999, p. 373). It is often found at the edges of riparian and xeroriparian drainages and even habitat edges created by villages, towns, and cities (Abbate et al. 1999, pp. 14–23; Proudfoot and Johnson 2000, p. 5).

The taxonomy of *Glaucidium* is complicated and has been the subject of much discussion and investigation. Following delisting of the pygmy-owl in 2006 (71 FR 19452; April 14, 2006), the Service was petitioned to relist the pygmy-owl (CBD and DOW 2007, entire). The petitioners requested a revised taxonomic consideration for the pygmy-owl based on Proudfoot et al. (2006a, p. 9; 2006b, p. 946) and König et al. (1999, pp. 160, 370–373), classifying the northern portion of *Glaucidium brasilianum*'s range as an entirely separate species, *G. ridgwayi* and recognizing two subspecies of *G. ridgwayi*: *G. r. cactorum* in western Mexico and Arizona and *G. r. ridgwayi* in eastern Mexico and Texas. Other recent studies proposing or supporting the change to *G. ridgwayi* for the northern portion of *G. brasilianum*'s range have been published in the past 20 years (Navarro-Sigüenza and Peterson 2004, p. 5; Wink et al. 2008, pp. 42–63; Enríquez et al. 2017, p. 15).

As we evaluated the cactus ferruginous pygmy-owl's current status, we found that, although there is genetic differentiation at the far ends of the pygmy-owl's distribution represented by Arizona and Texas, there continues to be uncertainty in the southern portion of the range. This area represents the boundary between the two proposed subspecies, which raises the question of whether there is adequate data to support a change in species classification and define the eastern and western distributions as separate subspecies. While future work and studies may clarify and resolve these issues, we will continue to use the currently accepted distribution of *G. brasilianum cactorum* as described in the 1957 American Ornithologists' Union (now the American Ornithological Society) checklist and various other publications (Friedmann et al. 1950,

p. 145; Oberholser 1974, p. 452; Johnsgard 1988, p. 159; Millsap and Johnson 1988, p. 137).

Regulatory and Analytical Framework

Regulatory Framework

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species is an endangered species or a threatened species. The Act defines an “endangered species” as a species that is in danger of extinction throughout all or a significant portion of its range, and a “threatened species” as a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The Act requires that we determine whether any species is an endangered species or a threatened species because of any of the following factors:

- (A) The present or threatened destruction, modification, or curtailment of its habitat or range;
- (B) Overutilization for commercial, recreational, scientific, or educational purposes;
- (C) Disease or predation;
- (D) The inadequacy of existing regulatory mechanisms; or
- (E) Other natural or manmade factors affecting its continued existence.

These factors represent broad categories of natural or human-caused actions or conditions that could have an effect on a species’ continued existence. In evaluating these actions and conditions, we look for those that may have a negative effect on individuals of the species, as well as other actions or conditions that may ameliorate any negative effects or may have positive effects.

We use the term “threat” to refer in general to actions or conditions that are known to or are reasonably likely to negatively affect individuals of a species. The term

“threat” includes actions or conditions that have a direct impact on individuals (direct impacts), as well as those that affect individuals through alteration of their habitat or required resources (stressors). The term “threat” may encompass—either together or separately—the source of the action or condition or the action or condition itself.

However, the mere identification of any threat(s) does not necessarily mean that the species meets the statutory definition of an “endangered species” or a “threatened species.” In determining whether a species meets either definition, we must evaluate all identified threats by considering the expected response by the species, and the effects of the threats—in light of those actions and conditions that will ameliorate the threats—on an individual, population, and species level. We evaluate each threat and its expected effects on the species, then analyze the cumulative effect of all of the threats on the species as a whole. We also consider the cumulative effect of the threats in light of those actions and conditions that will have positive effects on the species, such as any existing regulatory mechanisms or conservation efforts. The Secretary determines whether the species meets the definition of an “endangered species” or a “threatened species” only after conducting this cumulative analysis and describing the expected effect on the species now and in the foreseeable future.

The Act does not define the term “foreseeable future,” which appears in the statutory definition of “threatened species.” Our implementing regulations at 50 CFR 424.11(d) set forth a framework for evaluating the foreseeable future on a case-by-case basis. The term “foreseeable future” extends only so far into the future as the Service can reasonably determine that both the future threats and the species’ responses to those threats are likely. In other words, the foreseeable future is the period of time in which we can make reliable predictions. “Reliable” does not mean “certain”; it means sufficient to provide a reasonable degree of confidence in the prediction. Thus, a prediction is reliable if it is reasonable to depend on it when making decisions.

It is not always possible or necessary to define foreseeable future as a particular number of years. Analysis of the foreseeable future uses the best scientific and commercial data available and should consider the timeframes applicable to the relevant threats and to the species' likely responses to those threats in view of its life-history characteristics. Data that are typically relevant to assessing the species' biological response include species-specific factors such as lifespan, reproductive rates or productivity, certain behaviors, and other demographic factors.

Analytical Framework

The SSA report documents the results of our comprehensive biological review of the best scientific and commercial data regarding the status of the cactus ferruginous pygmy-owl, including an assessment of the potential threats to the subspecies. The SSA report does not represent a decision by the Service on whether the subspecies should be proposed for listing as an endangered or threatened species under the Act. However, it does provide the scientific basis that informs our regulatory decisions, which involve the further application of standards within the Act and its implementing regulations and policies. The following is a summary of the key results and conclusions from the SSA report; the full SSA report can be found under Docket No. FWS–R2–ES–2021–0098 at <http://www.regulations.gov> and at <https://www.fws.gov/southwest/es/arizona/>.

To assess the cactus ferruginous pygmy-owl's viability, we used the three conservation biology principles of resiliency, redundancy, and representation (Shaffer and Stein 2000, pp. 306–310). Briefly, resiliency supports the ability of the species to withstand environmental and demographic stochasticity (for example, wet or dry, warm or cold years), redundancy supports the ability of the species to withstand catastrophic events (for example, droughts, large pollution events), and representation supports the ability of the species to adapt over time to long-term changes in the environment (for example, climate changes). In general, the more resilient and redundant a species is and

the more representation it has, the more likely it is to sustain populations over time, even under changing environmental conditions. Using these principles, we identified the species' ecological requirements for survival and reproduction at the individual, population, and species levels, and described the beneficial and risk factors influencing the species' viability.

The SSA process can be categorized into three sequential stages. During the first stage, we evaluate the individual species' life-history needs. The next stage involves an assessment of the historical and current condition of the species' demographics and habitat characteristics, including an explanation of how the species arrived at its current condition. The final stage of the SSA involves making predictions about the species' responses to positive and negative environmental and anthropogenic influences. Throughout all of these stages, we use the best available information to characterize viability as the ability of a species to sustain populations in the wild over time. We use this information to inform our regulatory decision.

Summary of Biological Status and Threats

In this discussion, we review the biological condition of the cactus ferruginous pygmy-owl and its resources, and the threats that influence the subspecies' current and future condition, in order to assess the subspecies' overall viability and the risks to that viability. The overall geographic range of the pygmy-owl is very large (approximately 140,625 square miles [364,217 square kilometers]) and covers two countries, the United States and Mexico. To assist in our analysis, we divided the overall geographic range of the pygmy-owl into five analysis units based upon biological, vegetative, political, climatic, geographical, and conservation differences. The five analysis units are: Arizona, northern Sonora, western Mexico, Texas, and northeastern Mexico. We analyzed each of these analysis units individually and looked at a combined outcome across the entire range of the subspecies.

Threats

We reviewed the potential risk factors that could be affecting the pygmy-owl now and in the future including: climate change and climate condition (Factor E), habitat loss and fragmentation (Factor A), human activities and disturbance (Factors B and E), human-caused mortality (Factors B and E), disease and predation (Factor C), and small population size (Factor E). In this proposed rule, we will discuss only those factors in detail that could meaningfully impact the status of the subspecies. Those risks that are not known to have effects on pygmy-owl populations, such as disease, are not discussed here but are evaluated in the SSA report. The primary risk factors affecting the current and future status of the pygmy-owl are: (1) Habitat loss and fragmentation (Factor A), and (2) climate change and climate conditions (Factor E). For a detailed description of the threats analysis, please refer to the Species Status Assessment report (USFWS 2021, entire).

Habitat Loss and Fragmentation

Pygmy-owls require habitat elements, such as mature woodlands, that include appropriate cavities for nest sites, adequate structural diversity and cover, and a diverse prey base. Urbanization, invasive species, and agricultural or forest production are all leading to a reduction in the extent of habitat and an increase in habitat fragmentation throughout the geographic range of the subspecies.

Urbanization

Urbanization causes permanent impacts on the landscape that potentially result in the loss and alteration of pygmy-owl habitat. Residential, commercial, and infrastructure development replace and fragment areas of native vegetation resulting in the loss of available pygmy-owl habitat and habitat connectivity needed to support pygmy-owl dispersal and demographic support (exchange of individuals and rescue effect) of population groups.

Urbanization can also have detrimental effects on wildlife habitat by increasing the channelization or disruption of riverine corridors, the proliferation of exotic species, and the fragmentation of remaining patches of natural vegetation into smaller and smaller pieces that are unable to support viable populations of native plants or animals (Ewing et al. 2005, pp. 1–2; Nabhan and Holdsworth 1998, p. 2). Human-related mortality (e.g., shooting, collisions, and predation by pets) also increases as urbanization increases (Banks 1979, pp. 1–2; Churcher and Lawton 1987, p. 439). Development of roadways and their contribution to habitat loss and fragmentation is a particularly widespread impact of urbanization (Nickens 1991, p. 1). Data from Arizona and Mexico indicate that roadways and other open areas lacking cover affect pygmy-owl dispersal (Flesch and Steidl 2007, pp. 6–7; Abbate et al. 1999, p. 54). Nest success and juvenile survival were also lower at pygmy-owl nest sites closer to large roadways, suggesting that habitat quality may be reduced in those areas (Flesch and Steidl 2007, pp. 6–7).

From 2010 to 2020, population growth rates increased in all Arizona counties where the pygmy-owl occurs: Pima (9.3 percent); Pinal (25.7 percent); and Santa Cruz (13 percent) (OEO 2021, unpaginated). Many cities and towns within the historical distribution of the pygmy-owl in Arizona experienced substantial growth between April 2010 and July 2019: Casa Grande (20.7 percent); City of Eloy (17.8 percent); City of Florence (7.7 percent); Town of Marana (41.9 percent); Town of Oro Valley (12.2 percent); and the Town of Sahuarita (20.9 percent) (U.S. Census Bureau 2021, unpaginated). Urban expansion and human population growth trends in Arizona are expected to continue into the future. The Maricopa-Pima-Pinal County areas of Arizona are expected to grow by as much as 132 percent between 2005 and 2050, creating rural-urban edge effects across thousands of acres of pygmy-owl habitat (AECOM 2011, p. 13). Additionally, a wide area from the international border in Nogales, through Tucson, Phoenix, and north into Yavapai County (called the Sun Corridor “Megapolitan” Area) is

projected to have 11,297,000 people by 2050, a 132 percent increase from 2005 (AECOM 2011, p. 13). If build-out occurs as expected, it will encompass a substantial portion of the current and historical distribution of the pygmy-owl in Arizona.

In Texas, the pygmy-owl occurred in good numbers until approximately 90 percent of the mesquite-ebony woodlands of the Rio Grande delta were cleared in 1910–1950 (Oberholser 1974, p. 452). Currently, most of the pygmy-owl habitat occurs on private ranch lands and therefore the threat of habitat loss and fragmentation of the remaining pygmy-owl habitat due to urbanization is reduced. However, urbanization and agriculture along the United State-Mexico border are likely to continue to isolate the Texas population of pygmy-owls by restricting movements between Texas and northeastern Mexico.

The United States–Mexico border region has a distinct demographic pattern of permanent and temporary development related to warehouses, exports, and other border-related activities, and patterns of population growth in this area of northern Mexico has accelerated relative to other Mexican States (Pineiro 2001, pp. 1–2). The Sonoran border population has been increasing faster than that State’s average and faster than Arizona’s border population; between 1990 and 2000, the population in the Sonoran border municipios increased by 33.4 percent, compared to Sonora’s average (21.6 percent) and the average increase of Arizona’s border counties (27.8 percent). Urbanization has increased habitat conversion and fragmentation, which, along with immigration, population growth, and resource consumption, were ranked as the highest threats to the Sonoran Desert Ecoregion (Nabhan and Holdsworth 1998, p. 1). This pattern focuses development, and potential barriers or impediments to pygmy-owl movements, in a region that is important for demographic support (immigration events and gene flow) of pygmy-owl population groups, including movements such as dispersal. When looking specifically at the United States–Mexico border region extending from Texas to

California, the human population is approximately 15 million inhabitants and this population is expected to double by 2025 (HHS 2017, p. 1).

Significant human population expansion and urbanization in the Sierra Madre foothill corridor may represent a long-term risk to pygmy-owls in northeastern Mexico. From 2010 to 2015 the population in Tamaulipas increased by 8 percent to 3,527,735 and the population in Nuevo León increased by 24 percent to 5,784,442 (DataMexico 2021, unpaginated). Such increasing urbanization results in the permanent removal of pygmy-owl habitat reducing habitat availability and, more significantly, increases habitat fragmentation affecting the opportunity for pygmy-owl movements within northeastern Mexico and between Mexico and Texas. Habitat removal in northeastern Mexico is widespread and nearly complete in northern Tamaulipas (Hunter 1988, p. 8). Demographic support (rescue effect) of pygmy-owl population groups is threatened by ongoing loss and fragmentation of habitat in this area. Urbanization has the potential to permanently alter the last major landscape linkage between the pygmy-owl population in Texas and those in northeastern Mexico (Tewes 1993, pp. 28–29).

Human population growth in Sinaloa, Nayarit, Colima, and Jalisco, Mexico are relatively slow compared to Sonora and northeastern Mexico. From 2010 to 2015, the population in Sinaloa grew at a rate of 9.3 percent, Nayarit grew at a rate of 13.9 percent, Jalisco grew at a rate of 13.6 percent, and Colima grew at a rate of 12.4 percent (DataMexico 2021, unpaginated). These areas of Mexico are not experiencing the very high growth rates of Sonora and other border regions of Mexico, but will likely have some concurrent spread of urbanization. In addition, most of the growth is taking place in the large cities, and rather than in the rural areas that likely support pygmy-owl habitat (Brinkhoff 2016, unpaginated). However, these Mexican states have other threats to pygmy-owl habitat occurring such as agricultural development and deforestation that, in

combination with habitat lost to urbanization, represent threats to the continued viability of the pygmy-owl in this area.

Invasive Species

The invasion of nonnative vegetation, particularly nonnative grasses, has altered the natural fire regime over the Sonoran Desert ecoregion of the pygmy-owl range (Esque and Schwalbe 2002, p. 165). In areas comprised entirely of native species, ground vegetation density is mediated by barren spaces that do not allow fire to carry across the landscape. However, in areas where nonnative species have become established, the fine fuel load is continuous, and fire is capable of spreading quickly and efficiently (Esque and Schwalbe 2002, p. 175). As a result, fire has become a significant threat to the native vegetation of the Sonoran Desert.

Nonnative annual plants prevalent within the Sonoran range of the pygmy-owl include *Bromus rubens* and *B. tectorum* (brome grasses), *Schismus* spp. (Mediterranean grasses), and Sahara mustard (*Brassica tournefortii*) (Esque and Schwalbe 2002, p. 165; ASDM 2021, entire). However, the nonnative species that is currently the greatest threat to vegetation communities in Arizona and northern Sonora, Mexico is the perennial *Cenchrus ciliaris* (buffelgrass), which is prevalent and increasing throughout much of the Sonoran range of the pygmy-owl (Burquez and Quintana 1994, p. 23; Van Devender and Dimmit 2006, p. 5).

Buffelgrass is not only fire-tolerant (unlike native Sonoran Desert plant species), but is actually fire-promoting (Halverson and Guertin 2003, p. 13). Invasion sets in motion a grass-fire cycle where nonnative grass provides the fuel necessary to initiate and promote fire. Nonnative grasses recover more quickly than native grass, tree, and cacti species and cause a further susceptibility to fire (D'Antonio and Vitousek 1992, p. 73; Schmid and Rogers 1988, p. 442). While a single fire in an area may or may not produce long-term reductions in plant cover or biomass, repeated wildfires in a given area, due to

the establishment of nonnative grasses, are capable of ecosystem type-conversion from native desertscrub to nonnative annual grassland. These repeated fires may render the area unsuitable for pygmy-owls and other native wildlife due to the loss of trees and columnar cacti, and reduced diversity of cover and prey species (Brooks and Esque 2002, p. 336).

The distribution of buffelgrass has been supported and promoted by governments on both sides of the United States–Mexico border as a resource to increase range productivity and forage production. A 2006 publication estimates that 1.8 million ha (4.5 million ac) have been converted to buffelgrass in Sonora, and that between 1990 and 2000, there was an 82 percent increase in buffelgrass coverage (Franklin et al. 2006, pp. 62, 66). Following establishment, buffelgrass fuels fires that destroy Sonoran desertscrub, thornscrub, and, to a lesser extent, tropical deciduous forest; the disturbed areas are quickly converted to open savannas composed entirely of buffelgrass which removes pygmy-owl nest substrates and generally renders areas unsuitable for future occupancy by pygmy-owls. Buffelgrass is now fully naturalized in most of Sonora, southern Arizona, and some areas in central and southern Baja California (Burquez-Montijo et al. 2002, p. 131), and now commonly spreads without human cultivation (Arriaga et al. 2004, pp. 1509–1511; Perramond 2000, p. 131; Burquez et al. 1998, p. 26).

Similar issues occur in Texas. Buffelgrass is now one of the most abundant nonnative grasses in South Texas, and a prevalent invasive grass within the range of the pygmy-owl. During the 1950's, federal and state land management agencies promoted buffelgrass as a forage grass in South Texas (Smith 2010, p. 113). Buffelgrass is very well adapted to the hot, semi-arid climate of South Texas due to its drought resistance and ability to aggressively establish in heavily grazed landscapes (Smith 2010, p. 113). Despite increasing awareness of the ecological damage caused by nonnative grasses, buffelgrass is still planted in areas affected by drought and overgrazing to stabilize soils

and to increase rangeland productivity. Prescribed burning used for brush control typically promotes buffelgrass forage production in South Texas (Hamilton and Scifres 1982, p. 11). Buffelgrass often creates homogeneous monocultures by out-competing native plants for essential resources (Lyons et al. 2013, p. 8). Furthermore, buffelgrass produces phytotoxins in the soil that inhibit the growth of neighboring native plants (Vo 2013, unpaginated). With regard to pygmy-owl habitat, the loss of trees and canopy cover and the creation of dense ground cover resulting from buffelgrass conversion reduces nest cavity availability, cover for predator avoidance and thermoregulation, and prey availability. Overall, buffelgrass is the dominant herbaceous cover on 10 million ha in southern Texas and northeastern Mexico (Wied et al. 2020, p. 47).

The impacts of buffelgrass establishment and invasion are substantial for the pygmy-owl in the United States and Mexico because conversion results in the loss of important habitat features, particularly columnar cacti and trees that provide nest sites. Buffelgrass invasion and the subsequent fires eliminate most columnar cacti, trees, and shrubs of the desert (Burquez-Montijo et al. 2002, p. 138). This elimination of trees, shrubs, and columnar cacti from these areas is a potential threat to the survival of the pygmy-owl in the northern part of its range, as these vegetation components are necessary for roosting, nesting, protection from predators, and thermal regulation. Invasion and conversion to buffelgrass also negatively affect the diversity and availability of prey species in these areas (Franklin et al. 2006, p. 69; Avila-Jimenez 2004, p. 18; Burquez-Montijo et al. 2002, pp. 130, 135).

Buffelgrass is adapted to dry, arid conditions and does not grow in areas with high rates of precipitation or high humidity, above elevations of 1,265 m (4,150 ft), or in areas with freezing temperatures. Areas that support pygmy-owls south of Sonora and northern Sinaloa typically are wetter and more humid, and the best available information does not indicate that buffelgrass is invading the southern portion of the pygmy-owl's range.

Surveys completed in Sonora and Sinaloa in 2006 noted buffelgrass was present in Sonora and northern Sinaloa, but the more southerly locations were noted as sparse or moderate (Van Devender and Dimmitt 2006, p. 7). As such, this nonnative species only affects the northern parts of the pygmy-owl's range.

Agricultural Production and Wood Harvesting

Agricultural development and wood harvesting can result in substantial impacts to the availability and connectivity of pygmy-owl habitat. Conversion of native vegetation communities to agricultural fields or pastures for grazing has occurred within historical pygmy-owl habitat in both the United States and Mexico, and not only removes existing pygmy-owl habitat elements, but also can affect the long-term ability of these areas to return to native vegetation communities once agricultural activities cease. Wood harvesting has a direct effect on the amount of available cover and nest sites for pygmy-owls and is often associated with agricultural development. Wood harvesting also occurs to supply firewood and charcoal, and to provide material for cultural and decorative wood carvings.

In Arizona, although new agricultural development is limited, the effects to historical habitat are still evident. Many areas that historically supported meso- and xeriparian habitat have been converted to agricultural lands and associated groundwater pumping has affected the hydrology of these valleys (Jackson and Comus 1999, pp. 233, 249). These riparian areas are important pygmy-owl habitat, especially within drier upland vegetation communities like Sonoran desertscrub and semi-desert grasslands.

Habitat fragmentation as a result of agricultural development has also occurred within Texas. Brush clearing, pesticide use, and irrigation practices associated with agriculture have had detrimental effects on the Lower Rio Grande Valley (Jahrsdoerfer and Leslie 1988, p. 1). From the 1920's until the early 1970's, over 90 percent of pygmy-owl habitat in the Lower Rio Grande Valley of Texas was cleared

for agricultural and urban expansion (Oberholser 1974, p. 452). The Norias Division of the King Ranch in southern Texas has been isolated by agricultural expansion, which has restricted pygmy-owl dispersal (Oberholser 1974). This has resulted in loss of pygmy-owl habitat connectivity between pygmy-owl population groups in Texas and in Mexico. Historically, agriculture in Sonora, Mexico, was restricted to small areas with shallow water tables, but it had, nonetheless, seriously affected riparian areas by the end of the nineteenth century. For example, in the Rio Mayo and Rio Yaqui coastal plains, nearly one million ha (2.5 million ac) of mesquite, cottonwood, and willow riparian forests and coastal thornscrub disappeared after dams upriver started to operate (Burquez and Martinez-Yrizar 2007, p. 543).

Other Mexican states within the range of the pygmy-owl show similar potential for habitat loss. For example, in Tamaulipas, area under irrigation increased from 174,400 to 494,472 ha (431,000 to 1.22 million ac) between 1998 and 2004, with an area of 668,872 ha (1.65 million ac) equipped for irrigation. However, agricultural development in the States of Colima, Jalisco, Nayarit, and Nuevo Leon had substantial decreases in the amount of irrigated lands over the same period (FAO 2007, unpaginated). Although land continues to be converted to agriculture within the geographic range of the pygmy-owl, we do not know if the areas being converted currently support pygmy-owl habitat. Continuing destruction of pygmy-owl habitat for agricultural production is not occurring with the same intensity throughout the range of the pygmy-owl, and the area in agricultural production may be declining in some parts of its southern range.

Wood harvesting is also a potential threat to pygmy-owl habitat. Ironwood (*Olneya tesota*) and mesquite (*Prosopis* spp.) are harvested throughout the Sonoran Desert for use as charcoal, fuelwood, and carving (Burquez and Martinez Yrizar 2007, p. 545). For instance, by 1994, 202,000 ha (500,000 ac) of mesquite had been cleared in

northern Mexico to meet the growing demand for mesquite charcoal (Haller 1994, p. 1). Unfortunately, woodcutters and charcoal makers utilize large, mature mesquite and ironwood trees growing in riparian areas (Taylor 2006, p. 12), which is the tree class that is of most value as pygmy-owl habitat. Loss of leguminous trees results in long-term effects to the soil as they add organic matter, fix nitrogen, and add sulfur and soluble salts, affecting overall habitat quality and quantity (Rodriguez Franco and Aguirre 1996, p. 6-47). Ironwood and mesquite trees are important nurse species for saguaros, the primary nesting substrate for pygmy-owls in the northern portion of their range (Burquez and Quintana 1994, p. 11). Declining tree populations in the Sonoran Desert as a result of commercial uses and land conversion threatens other plant species and may alter the structure and composition of the vertebrate and invertebrate communities as well (Bestelmeyer and Schooley 1999, p. 644). This has implications for pygmy-owl prey availability because pygmy-owls rely on a seasonal diversity of vertebrate and invertebrate prey species; loss of tree structure and diversity reduces prey diversity and availability.

Once common in areas of the Rio Grande delta, significant habitat loss and fragmentation due to woodcutting have now caused the pygmy-owl to be a rare occurrence in this area of Texas. Oberholser (1974, p. 452) concluded that agricultural expansion and subsequent loss of native woodland and thornscrub habitat, begun in the 1920's, preceded the rapid demise of pygmy-owl populations in the Lower Rio Grande Valley of southern Texas. Because much of the suitable pygmy-owl habitat in Texas occurs on private ranches, habitat areas are subject to potential impacts that are associated with ongoing ranch activities such as grazing, herd management, fencing, pasture improvements, construction of cattle pens and waters, road construction, and development of hunting facilities. Brush clearing, in particular, has been identified as a potential factor in present and future declines in the pygmy-owl population in Texas

(Oberholser 1974, p. 452). However, relatively speaking, the current loss of habitat is much reduced in comparison to the historical loss of habitat in Texas. Conversely, ranch practices that enhance or increase pygmy-owl habitat to support ecotourism can contribute to conservation of the pygmy-owl in Texas (Wauer et al. 1993, p. 1076). The best available information does not indicate that current ranching practices are significantly affecting pygmy-owl habitat in Texas.

Habitat fragmentation in northeastern Mexico is extensive, with only about two percent of the ecoregion remaining intact, and no habitat blocks larger than 250 square km (96.5 square mi), and no significant protected areas (Cook et al. 2000, p. 4). Fire is often used to clear woodlands for agriculture in this area of Mexico, and many of these fires are not adequately controlled. There may be fire-extensive related effects to native plant communities (Cook et al. 2000, p. 4); however, there is no available information of how much area may be affected by this activity.

Areas of dry subtropical forests, important habitat for pygmy-owls in southwestern Mexico, have been used by humans through time for settlement and various other activities (Trejo and Dirzo 2000, p. 133). The long-term impact of this settlement has converted these dry subtropical forests into shrublands and savannas lacking large trees, columnar cacti, and cover and prey diversity that are important pygmy-owl habitat elements. In Mexico, dry tropical forest is the major type of tropical vegetation in the country, covering over 60 percent of the total area of tropical vegetation. About 8 percent (approximately 160,000 square km (61,776 square mi)) of this forest remained intact by the late 1970s, and an assessment made at the beginning of the present decade suggested that 30 percent of these tropical forests have been altered and converted to agricultural lands and cattle grasslands (Trejo and Drizo 2000, p. 134). However, the best available information indicates that there are still expanses of dry tropical forest along the Pacific

coast in Mexico, including some areas below 1,200 m (4,000 ft) where pygmy-owls are found.

Summary of Habitat Loss and Fragmentation

In summary, pygmy-owls require habitat elements such as mature woodlands that include appropriate cavities for nest sites, adequate structural diversity and cover, and a diverse prey base. These habitat elements need to be available across the geographic range of the pygmy-owl and spatially arranged to allow connectivity between habitat patches. Pygmy-owl habitat loss and fragmentation are affecting pygmy-owl viability throughout its range. These threats vary in scope and intensity throughout the pygmy-owl's geographic range and specific threats are a more significant issue in certain parts of the range than in others. For example, in Arizona and Northern Sonoran, pygmy-owl habitat loss and fragmentation resulting from urbanization, changing fire regimes due to the invasion of buffelgrass, and agricultural development and woodcutting are significant threats that have negatively affected pygmy-owl habitat. In Texas, historical loss of habitat has reduced the pygmy-owl range, but current impacts are reduced from historical levels in their magnitude and severity. However, in Texas and other areas of the pygmy-owl's range, these past impacts continue to affect the current extent of available pygmy-owl habitat, because of the extended time it takes for these lands to recover. Therefore, even if habitat destruction ceases, the negative effects of past land use are expected to continue in many of these areas into the future.

For the remainder of the pygmy-owl's range and habitat in Mexico (northeastern Mexico and south of Sonora), data available for our analysis were limited. The rate of growth in these southern Mexican States appears to be lower than in Sonora and the Arizona border region. Historical loss of pygmy-owl habitat in northeastern Mexico has occurred, but the extent to which significant habitat destruction is currently taking place

is not available. In addition, pygmy-owls are still considered common in the southern part of their range (Enriquez-Rocha et al. 1993, p. 154; Cartron et al. 2000, p. 5; GBIF 2020).

This information indicates that the impacts to pygmy-owl habitat discussed herein may be having different levels of effects on the populations of pygmy-owls throughout their range, and habitat effects may not have the impacts to pygmy-owl population groups in the southern portion of the pygmy-owl's range due to increased pygmy-owl numbers. Nonetheless, Enríquez and Vazquez-Perez (2017, p. 546) indicate that during the last 50 years, Mexico has seen drastic changes in land uses due to rapid urbanization and industrialization, which has been poorly planned. The result has been impacts to the natural environment, including the degradation and loss of biological diversity in Mexico. There has been limited work in Mexico, however, to understand what the direct impacts of these threats are on owl population losses and changes in distribution and abundance of subspecies in long term (Enríquez and Vazquez-Perez 2017, p. 546).

Climate Change and Climate Conditions

Climate change projections within the geographic range of the pygmy-owl show that increasing temperatures, decreasing precipitation, and increase intensity of weather events are likely (Karmalkar et al. 2011, entire; Bagne and Finch 2012, entire; Coe et al. 2012, entire; and Jiang and Yang 2012, entire). Climate influences pygmy-owl habitat conditions and availability through the loss of vegetation cover, reduced prey availability, increased predation, reduced nest site availability, and vegetation community change. The majority of the current range of the pygmy-owl occurs in tropical or subtropical vegetation communities, which may be reduced in coverage if climate change results in hotter, more arid conditions. Additionally, models predict that the distribution of suitable habitat for saguaros, the primary pygmy-owl nesting substrate within the Sonoran Desert ecoregion, will substantially decrease over the next 50 years under a moderate climate change scenario (Weiss and Overpeck 2005, p. 2074; Thomas et al. 2012, p. 43). Climate

change scenarios project that drought will occur more frequently and increase in severity, with a decrease in the frequency and increase in severity of precipitation events (Seager et al. 2007, p. 9; Cook et al. 2015, p. 6; Pascale et al. 2017, p. 806; Williams et al. 2020, p. 317). Drought and changes to the timing and intensity of precipitation events may reduce available cover and prey for pygmy-owls adjacent to riparian areas through scouring flood events and reduced moisture retention. Although the extent to which changing climatic patterns will affect the pygmy-owl is better understood following the past decade of observations in the field, there remains uncertainty with regard to the overall extent and timing of impacts.

Synergistic interactions are likely to occur between the effects of climate change and habitat fragmentation and loss. Climate change projections indicate that conditions will likely favor increased occurrence and distribution of nonnative, invasive species and alteration of historical fire regimes. Climate change may also affect the viability of the pygmy-owl through precipitation-driven changes in plant and insect biomass, which in turn influence abundance of lizards, small mammals, and birds (Jones 1981, p. 111; Flesch 2008, p. 5; Flesch et al. 2015, p. 26). Decreased precipitation generally reduces plant cover and insect productivity, which in turn reduce the abundance and availability of pygmy-owl prey species. Similarly, increased temperatures reduce pygmy-owl prey activity due to increased energetic demands of thermoregulation and a decreased availability of prey and cover (Flesch et al. 2015, p. 26). These indirect effects on prey availability and direct effects on prey activity affect nestling growth, development, and survival. When decreased precipitation affects food supply and increased temperature affects prey activity, reduced pygmy-owl productivity is likely to result in reduced pygmy-owl resiliency (Flesch et al. 2015, p. 26). Climate change can also influence natural events, such as hurricanes and tropical storms, which can modify and fragment habitats, primarily through loss of woody cover. Historical and ongoing threats to the

pygmy-owl from habitat loss and fragmentation as well as from climate change and climate conditions, have shaped the current habitat and population conditions of the subspecies throughout its range.

Current Condition

To assess resiliency, we evaluated six components that broadly related to the subspecies' population demography or physical environment and for which we had data sufficient to conduct the analysis. We assessed each analysis unit's physical environment by examining three components determined to have the most influence on the subspecies: habitat intactness, prey availability, and vegetation health and cover. We also assessed each analysis unit's demography through abundance, occupancy, and evidence of reproduction. We established parameters for each component by evaluating the range of existing data and separating those data into categories based on our understanding of the subspecies' demographics and habitat. Using the demographic and habitat parameters, we then categorized the overall condition of each analysis unit. We provide a summary of each of the six factors below and describe them in detail in the SSA report (Service 2021, entire).

Demographic Factors

Abundance: Larger populations have a lower risk of extinction than smaller populations (Pimm et al. 1988, pp. 773–775; Trombulak et al. 2004, p. 1183). In contrast, small populations are less resilient and more vulnerable to the effects of demographic, environmental, and genetic stochasticity, and have a higher risk of extinction than larger populations (Trombulak et al. 2004, p. 1183). Small populations may experience increased inbreeding, loss of genetic variation, and ultimately a decreased potential to adapt to environmental change (Trombulak et al. 2004, p. 1183; Harmon and Braude 2010, p. 125; Benson et al. 2016, pp. 1–2). The abundance of pygmy-owls within each analysis unit must be high enough to support persistence of pygmy-owl population

groups (multiple breeding pairs of pygmy-owls within relatively discrete geographic areas) within the analysis unit. This is accomplished by having adequate patches of habitat to support multiple nesting pairs of pygmy-owls and their offspring, have adequate habitat connectivity to support establishment of additional territories by dispersing young, and supply floaters (unpaired individuals of breeding age) within each pygmy-owl population group to offset loss of breeding adults and to provide potential mates for dispersing juveniles.

Occupancy: Sufficiently resilient pygmy-owl populations must occupy large enough areas such that stochastic events and environmental fluctuations that affect individual pygmy-owls, or population group of pygmy-owls, do not eliminate the entire population. Pygmy-owls are patchily distributed across the landscape in population groups of nesting owls. Each of these population groups must be occupied by large enough numbers of pygmy-owls to enable the population group to persist on the landscape over time. Enough occupied population groups of pygmy-owls must also exist on the landscape, with interconnected habitat supporting movement among population groups, so that each population group can receive or exchange individuals with any given adjacent population group.

Pygmy-owl occupancy is an indicator of habitat conditions as well as demographic factors, such as reproduction and survival. Habitats that support large numbers of pygmy-owls are better able to provide floaters and available mates to dispersing pygmy-owls from adjacent populations. These floaters are able to serve as replacement breeders if either or both members of an existing breeding pair are lost. Observations indicate that if a site is occupied by a breeding pair, they will breed. Survival of adults also affects occupancy, as some occupied sites will be abandoned if one of the adult breeders perishes. These sites can be reoccupied in the future when floaters or dispersing birds move into the area.

Evidence of reproduction: Resilient pygmy-owl populations must also reproduce and produce a sufficient number of young such that recruitment equals or exceeds mortality. Current population size and abundance reflects previous influences on the population and habitat, while reproduction and recruitment reflect population trends that may be stable, increasing, or decreasing in the future. Adequately resilient populations of the pygmy-owl must have sufficient numbers of individuals to replace members of breeding pairs that have been lost and to support persistent population groups of nesting pygmy-owls through dispersal. However, the necessary reproductive rate needed for a self-sustaining population is unknown. Additionally, key demographic parameters of pygmy-owl populations (e.g., survival, life expectancy, lifespan, productivity, etc.) are unknown throughout most of the geographic range. Due to the lack of information on demographic parameters of reproduction, recruitment, and survival, we broadly considered evidence of reproduction to include any evidence of reproduction (e.g., active nests, presence of eggs or nestlings, fledglings, etc.), as well as persistence of occupied territories and population groups in an area over a sufficient amount of time to indicate evidence of reproduction. Thus, evidence of reproduction on a consistent basis over time likely indicates a sufficiently resilient population.

Habitat intactness: Adequately resilient pygmy-owl populations need intact habitat that is large enough to support year-round occupancy, as well as connectivity between habitat patches to enable dispersal. Pygmy-owls are patchily distributed across much of their geographic range. These pygmy-owl population groups are dependent on interchange of individuals in order to maintain adequate numbers and genetic diversity on the landscape. Habitat connectivity is crucial to maintaining pathways for the interchange of individuals among pygmy-owl population groups.

Prey availability: Adequate prey availability is a key component for maintaining resiliency in pygmy-owl populations. Year-round prey availability is essential throughout

the range of the pygmy-owl, with portions of the geographic range characterized by seasonal variability in available prey resources. The abundance of many of these prey species is influenced by annual and seasonal precipitation through increases and decreases in vegetation cover and diversity, which also influences insect abundance and availability. Sufficiently resilient pygmy-owl populations require adequate precipitation to support year-round prey availability. This includes appropriately timed precipitation to support seasonally available prey such as lizard, insects, and small mammals.

Vegetation cover: Sufficiently resilient pygmy-owl populations require adequate vegetation to provide cover for predator avoidance, thermoregulation, hunting, and nest cavities. Of primary importance for cover is the presence of woody vegetation canopy. Maintenance of the health and vigor of this woody cover is a key component to maintaining resiliency of pygmy-owl populations.

Summary of Current Condition of the Subspecies

Currently, the cactus ferruginous pygmy-owl occurs from southern Arizona, south to Michoacán in the western portion of its range, and from southern Texas to Tamaulipas and Nuevo Leon in the eastern portion of its range. For our analysis, we divided the pygmy-owl's overall range into five analysis units: Arizona, northern Sonora, western Mexico, Texas, and northeastern Mexico (see Figure 1, below). The primary factors currently affecting the condition of cactus ferruginous pygmy-owl populations include climate conditions, and habitat fragmentation and loss.

Resiliency

The Arizona analysis unit currently has the lowest pygmy-owl abundance of all analysis units, which is estimated to be in the low hundreds. Habitat fragmentation and loss from urbanization and increases in invasive species such as buffelgrass, have reduced the availability and connectivity of habitat in this analysis unit. Additionally, climate conditions have reduced prey availability and vegetative cover through increased

temperatures and drought. These factors result in a reduced capacity for this analysis unit to withstand stochastic events and result in a low resiliency currently.

The northern Sonora analysis unit has an estimated pygmy-owl abundance in the high hundreds. However, this analysis unit is affected by habitat fragmentation from urbanization, agricultural development, and associated infrastructure. These stressors increase water use and, in conjunction with climate conditions, result in a reduction in the quality and availability of pygmy-owl habitat. Due to moderate owl abundance and some decrease in habitat availability and connectivity, the northern Sonora analysis unit has a moderate level of population resiliency.

The western Mexico analysis unit is estimated to have tens of thousands of pygmy-owls. This analysis unit has some habitat fragmentation from urbanization, agricultural development, and deforestation of the tropical deciduous forests. Overall, the western Mexico analysis unit has high population resiliency due to high abundance of pygmy-owls and healthy vegetation cover, likely as a result of high levels of precipitation in the region.

The Texas analysis unit has an estimated pygmy-owl abundance in the high hundreds. Land ownership within this analysis unit has resulted in habitat fragmentation and, due to agricultural development and wood harvesting within the Rio Grande Valley, this analysis unit is somewhat genetically isolated from the rest of the geographic range of the subspecies. Due to moderate pygmy-owl abundance, fragmentation of habitat, and some genetic isolation, the Texas analysis unit has a moderate level of population resiliency.

The northeast Mexico analysis unit is estimated to have tens of thousands of pygmy-owls. However, this unit has high levels of habitat fragmentation due to urbanization and agricultural development. Overall, the northeast Mexico analysis unit has a moderate level of population resiliency with some capacity to withstand stochastic

events. Rangewide, current condition of the pygmy-owl populations indicate that three analysis units are maintaining a moderate level of population resiliency, one analysis has low resiliency, and one analysis unit has high resiliency.

Representation

Resiliency, and the factors that drive resiliency, also contribute to the pygmy-owl's representation on the landscape. Pygmy-owls occupy a diversity of habitat types throughout the geographic range of the subspecies and maintain substantial genetic diversity. The subspecies' adaptive potential (representation) is currently high due to genetic and ecological variability across the range. There is substantial genetic diversity across the range (Proudfoot et al. 2006a, entire; 2006b, entire) due to isolation-by-distance and geographic barriers. Additionally, across the range, the pygmy-owl occupies a diverse range of ecological settings as a result of geographic gradients of vegetation, climate, elevation, topography, and other landscape elements. Such ecological diversity could help the pygmy-owl adapt to and survive future environmental changes, such as warming temperatures or decreased precipitation from climate change.

Redundancy

We assessed the number and distribution of populations across the pygmy-owl's geographic range as a measure of its redundancy. While the numbers and densities of pygmy-owls are lower in some analysis units, these portions of the range still contribute in a meaningful way to the overall pygmy-owl population. Each analysis unit within the geographic range of the subspecies maintains a network of population groups that are connected both within and between analysis units. These population groups have the potential to recolonize areas where other population groups are lost to catastrophic events. All analysis units contribute to the total rangewide population, and population groups within each analysis unit provide population support for that analysis unit and adjacent portions of the range. If an analysis unit is self-sustaining, it provides

redundancy across the range, and may provide emigrants to support adjacent analysis units. Research and monitoring have documented exchange of individual cactus ferruginous pygmy-owls among population groups within the Arizona, northern Sonora, and Texas analysis units, and between the Arizona and northern Sonora analysis units (Abbate et al. 2000, p. 30; Flesch and Steidl 2007, p. 37; Proudfoot et al. 2020, unpaginated; AGFD unpublished data). Habitat fragmentation and reduced vegetation health as a result of ongoing drought have resulted in the extirpation of population groups in Arizona and Texas, but redundancy was exhibited in the northern Sonora analysis unit when drought conditions eased and historically occupied areas were reoccupied (Flesch et al 2017, p. 12). Despite existing habitat fragmentation, research and monitoring have documented that exchange of individual pygmy-owls between population groups and between some analysis units is still occurring. Habitat types used by pygmy-owls vary across the range, with some vegetation types being restricted to certain portions of the geographic range. It is important to maintain pygmy-owl populations throughout the range to provide redundancy to adjacent populations in similar habitat conditions. Due to the broad geographic distribution and network of populations groups that are connected within and between some analysis units throughout most of its range, the pygmy-owl has some ability to recolonize following catastrophic events and is considered to have adequate redundancy.

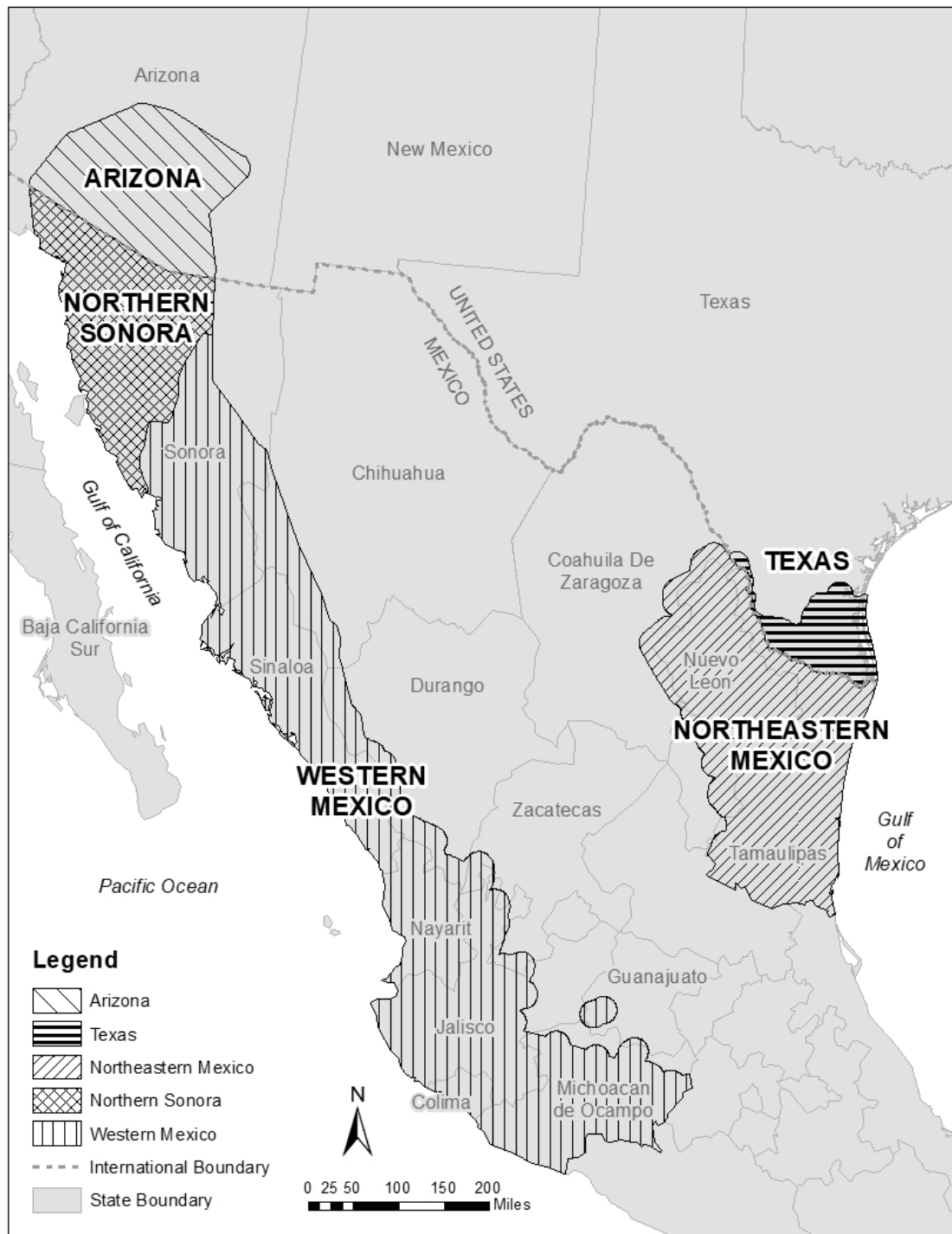


Figure 1. Cactus ferruginous pygmy-owl's range in the United States and Mexico, including the five analysis units used in the SSA.

Future Scenarios

In our SSA report, we defined viability as the ability of a species to sustain populations in the wild over time. To help address uncertainty associated with the degree and extent of potential future stressors and their impacts on species' needs, the concepts

of resiliency, redundancy, and representation were assessed using three plausible future scenarios. We developed these scenarios by identifying information on the following primary factors anticipated to affect the cactus ferruginous pygmy-owl in the future: climate change, habitat loss and fragmentation, and conservation activity. The three scenarios capture the range of uncertainty in the changing landscape and how the pygmy-owl would respond to the changing conditions. We used the best available data and models to project out 30 years into the future (i.e., 2050).

We chose this timeframe based on the subspecies' life span and observed cycles in population abundance, as well as the time period where we could reasonably project certain land use changes and urbanization patterns relevant to the pygmy-owl and its habitat. The majority of the projections of urbanization and population growth within the geographic range of the pygmy-owl extend to 2050. Since urbanization and development are some of the primary drivers of habitat loss and fragmentation, we extended our analysis only as far as we could reasonably project these changes and the species response to those changes. Additionally, the average lifespan of a pygmy-owl is 3 to 5 years. Thus, over a 30-year timeframe, we would expect eight to ten generations of pygmy-owls to be produced which should be adequate to assess the effects of both threats and conservation actions. Because the primary avenue through which pygmy-owls move across the landscape is through the dispersal of juveniles, it can take multiple generations to provide adequate exchange of individuals to elicit detectable change at the population group and analysis unit scale. Including multiple generations of pygmy-owls also allows adequate time to account for lags in demographic factors resulting from changes in environmental conditions. Therefore, this number of generations is sufficient to assess the effective levels of resiliency, redundancy and representation. Monitoring of pygmy-owl occupancy and productivity also indicates that, at least in Arizona and northern Sonora, 30 years was an adequate time period to document abundance cycles driven by climate

conditions. Monitoring in both Arizona and northern Sonora from the mid-1990s to present showed a period of decline in occupancy and productivity, primarily due to drought, followed by an increase in productivity and occupancy during years of better precipitation such that abundance and occupancy recovered to nearly the original levels (Flesch et al. 2017, p. 12; Service 2021, entire). For more information on the models and their projections, please see the SSA report (Service 2021, entire).

Under Scenario 1 (continuation of current trends), we projected there would be no significant changes to the rate of habitat loss and fragmentation within the subspecies' range. For this scenario, we considered that climate change would track Representative Concentration Pathway (RCP) 4.5, which is one of four alternative trajectories for carbon dioxide emissions set forth by the International Panel on Climate Change. Specifically, RCP4.5 is an intermediate scenario where carbon dioxide emissions continue to increase through the mid-21st century, but then decline. This scenario would result in atmospheric carbon dioxide levels between 580 and 720 parts per million (ppm) between 2050 and 2100 and would represent an approximately 2.5 °C increase in global mean temperature relative to the period 1861–1880 (IPCC 2014, p. 9). We also considered that conservation efforts that are currently underway, such as captive rearing, would continue to be limited in their efficacy, due to limited resources and the continued efforts to identify appropriate and effective methodologies and protocols. Additionally, climate change will continue to affect the suitability of conditions at release sites for captive-reared pygmy-owls, potentially limiting the effectiveness of pygmy-owl releases.

Under these conditions, we do not anticipate that any of the factors used to evaluate resiliency would improve and, in fact, vegetation intactness would be reduced due to continued development. Northeastern Mexico is projected to maintain its current level of high pygmy-owl abundance because significant changes to habitat conditions are not expected. Because of this, the northeastern Mexico analysis unit is expected to

maintain a moderate level of population resiliency under this scenario. Conditions in the Arizona analysis unit would continue to decline due to continued habitat fragmentation and climate change, and resiliency would remain low. Resiliency in the remaining three analysis units, northern Sonora, western Mexico, and Texas, would decline due to continued loss of cactus ferruginous pygmy-owl habitat, reduced habitat intactness, and a reduction in cover and prey availability for cactus ferruginous pygmy-owls. Overall, current levels of population redundancy and representation would be maintained rangewide because all analysis units would remain occupied; however, representation within each analysis unit would likely decline at the population-group scale.

Under Scenario 2 (worsening or increased effects scenario), we projected increased rates of habitat loss and fragmentation leading to a decline in pygmy-owl habitat conditions. For this scenario, we considered that climate change would track RCP8.5, which is the highest greenhouse gas emission scenario. Under this scenario, atmospheric carbon dioxide concentrations are projected to exceed 1,000 ppm between 2050 and 2100 and would represent a 4.5°C increase in global mean temperature (IPCC 2014, p. 9). We also considered that conservation efforts that are currently underway would not be effective or would not be implemented.

Increased habitat loss and fragmentation would result in the greatest effect to overall resiliency through a reduction in abundance and occupancy of pygmy-owls. Increased development and urbanization would result in a permanent loss of habitat. Indirect effects to vegetation and prey availability as a result of climate change would also be expected. Due to increased habitat fragmentation, such as agricultural development, as well as a reduction in vegetation health from drought, resiliency in the western Mexico analysis unit is projected to decline. Under this scenario, climate change and increased habitat fragmentation from urbanization and agricultural development lead to the loss of some population groups within the Texas, Arizona, and northern Sonora

analysis units. The resultant decline would decrease representation and redundancy within these analysis units. In particular, the Texas and Arizona analysis units would become more vulnerable to extirpation because of low pygmy-owl abundance and occupancy driven by reduced habitat quality as a result of drought and high levels of habitat fragmentation from ongoing urbanization and agricultural development. Genetic representation would be reduced through the loss of population groups or analysis units and the subsequent reduction of gene flow. Overall, there would be a reduction in resiliency, representation, and redundancy within most analysis units and the likelihood of maintaining long-term viability would be considerably reduced.

Under Scenario 3 (improving or reduced effects scenario), we project that habitat loss and fragmentation would continue, but at a reduced rate. For this scenario, we considered that climate change would track RCP4.5, and conservation efforts that are currently underway would be effective. We did not include other planned conservation efforts in this scenario because we are not aware of any that would significantly influence the viability of the species.

Despite effective conservation actions in portions of the range, the viability of pygmy-owl populations would continue to decline within all five analysis units due to the ongoing effects of habitat loss, fragmentation, and climate change. Resiliency would remain low in the Arizona analysis unit and would decline in both the northern Sonora and western Mexico analysis units due to a reduction in habitat quality as a result of climate change. Pygmy-owl habitat fragmentation from urbanization, deforestation, and agricultural development are expected to continue under this scenario, though at a slower rate. Resiliency would remain in moderate condition for the Texas and northeastern Mexico analysis units. Although habitat conditions are expected to continue to decline due to drought and climate change, we do not expect a large decline in pygmy-owl occupancy and abundance in Texas and northeastern Mexico. Under this scenario, each

analysis unit remains occupied and contributes to the representation and redundancy across the range of the pygmy-owl. However, within each analysis unit, threats continue, albeit at a reduced rate, and the resiliency of population groups would decline in three of the five analysis units. Thus, within analysis units, representation and redundancy is likely to decrease at the population-group scale.

Cumulative Effects

We note that, by using the SSA framework to guide our analysis of the scientific information documented in the SSA report, we have not only analyzed individual effects on the subspecies, but we have also analyzed their potential cumulative effects. We incorporate the cumulative effects into our SSA analysis when we characterize the current and future condition of the subspecies. To assess the current and future condition of the subspecies, we undertake an iterative analysis that encompasses and incorporates the threats individually and then accumulates and evaluates the effects of all the factors that may be influencing the subspecies, including threats and conservation efforts. Because the SSA framework considers not just the presence of the factors, but to what degree they collectively influence risk to the entire subspecies, our assessment integrates the cumulative effects of the factors and replaces a standalone cumulative effects analysis.

Conservation Efforts and Regulatory Mechanisms

Because we are considering the best available information and because the discussion above primarily addresses the viability of the cactus ferruginous pygmy-owl in relation to the threats and factors affecting its viability, here we will discuss regulatory mechanisms and conservation actions that potentially have or will influence the current and future viability of the cactus ferruginous pygmy-owl.

Federal Protections

Although the pygmy-owl in Arizona is considered nonmigratory, it is included on the list of birds protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703–712). The MBTA prohibits “take” of any migratory bird. However, unlike the Endangered Species Act, there are no provisions in the MBTA preventing habitat destruction unless direct mortality or destruction of an active nest occurs. Approximately 31 percent of the pygmy-owl’s historical geographic range in the United States is federally owned, with Federally-owned lands making up approximately 40 percent of pygmy-owl habitat in Arizona. However, a substantial extent of the known currently occupied habitats occur on State Trust lands in Arizona and on private lands in Texas. Other Federal regulations and policies such as the Clean Water Act (33 U.S.C. 1251 et seq.), the military’s integrated natural resources management plans (INRMPs, such as the one for the Barry M. Goldwater Range) (Uken 2008, pers. comm.), and National Park Service policy provide varying levels of protection, but they have not been effective in protecting the pygmy-owl from further decline in Arizona. As a result of the implementation of the 2005 Real ID Act (Division B of Pub. L. 109–13), the U.S. Department of Homeland Security (DHS) has waived application of the Act and other environmental laws in the construction of border infrastructure, including areas occupied by the pygmy-owl (73 FR 5272; January 29, 2008). As recently as 2020, DHS waived environmental compliance for the construction of border walls along the U.S.–Mexico border in Arizona and Texas (Fischer 2019, entire; USCBP 2020, entire). Consequently, pygmy-owl habitat has been lost and fragmented along most of the border area in Arizona and, to a lesser extent, Texas. Of particular concern is the potential for border infrastructure to reduce habitat connectivity into occupied pygmy-owl habitat in Mexico.

State Protections

The pygmy-owl is included on the State of Arizona’s list of species of concern (AGFD 2021, p. 16). Arizona statute does not address the root causes leading to

destruction or alteration of pygmy-owl habitat. The State of Texas lists the pygmy-owl as threatened (Texas Administrative Code, title 31, part 2, chapter 65, subchapter G, rule 65.175; TPWD 2009, p. 1). This designation allows permits to be issued for the taking, possession, propagation, transportation, sale, importation, or exportation of pygmy-owls if necessary to properly manage that species, but does not provide any habitat protections (Texas Park and Wildlife Code, chapter 67, section 67.0041).

Protections in Mexico

Within Mexico, the distribution of owls is large and includes multiple States. The administration of land use in Mexico depends on the national government, which implements Natural Protected Areas and other Federal programs, and also the policies of each State and even municipal governments (Enríquez 2021, pers. comm.). This system represents a wide range of management, conservation, and natural resource use approaches that affect pygmy-owl conservation, resulting in inconsistent policies and implementation of conservation activities. Similar to state laws in the United States, there are currently no laws or regulations in Mexico that specifically protect pygmy-owls and pygmy-owl habitat. As is the case throughout the geographic range of the pygmy-owl, with so many entities involved in how lands in Mexico are used and managed, it is complicated and, sometimes, unrealistic to implement widespread, consistent application of regulations that promote the conservation of pygmy-owls in Mexico.

Conservation Efforts

Cactus ferruginous pygmy-owl conservation activities have occurred sporadically over the past three decades in both the United States and in northern Sonora in Mexico. Initial conservation efforts developed effective and safe protocols for studying the cactus ferruginous pygmy-owl and on gathering basic life-history information. Efforts expanded in the late 1990s and early 2000s to include important pygmy-owl work in Arizona,

Texas, and northern Sonora. For the past two decades, studies have been irregular and focused on monitoring of known territories.

Surveying and Monitoring

The Arizona Game and Fish Department (AGFD) initiated surveys to determine the extent of cactus ferruginous pygmy-owl occurrences in Arizona in 1992, when the cactus ferruginous pygmy-owl was first petitioned to be listed under the Act. Survey and monitoring work by a variety of entities continued through 2006, when the species was delisted. Prior to delisting, survey and monitoring efforts were focused in Pima and Pinal Counties to document the occupancy pattern of cactus ferruginous pygmy-owls in areas of land use changes, primarily urban development. After the pygmy-owl was delisted in 2006, a small number of monitoring surveys continued to be conducted by Service and AGFD biologists. In 2020, AGFD coordinated a comprehensive survey effort, with the help of numerous partners, to gather data on the current numbers and distribution of the cactus ferruginous pygmy-owl in Arizona to inform this listing decision. Specifically, this effort included surveys to document distribution, territory occupancy monitoring, and some nest searches to document reproduction. This latest effort provided data on current distribution of the pygmy-owl in Arizona and the number of occupied territories, as well as some information on the number of active nesting territories (AGFD 2020, pers. comm.). These data are incorporated into the SSA report. However, these efforts did not provide any information on productivity or survival at these sites.

Nest Box Trials

Because cactus ferruginous pygmy-owls are secondary cavity nesters, the number of available cavities may influence the viability of cactus ferruginous pygmy-owls on the landscape (Proudfoot 1996, p. 68). Using nest boxes as a management tool may enhance the viability of cactus ferruginous pygmy-owls by increasing cavity availability and reducing predation. Nest boxes also enhance access to the owls during nesting and

facilitate our ability to conduct research. Research in Texas demonstrated successful use of artificial nest structures by cactus ferruginous pygmy-owls (Proudfoot et al. 1999, pp. 5–6). In response to concerns about cavity availability, two nest box trials were conducted in Arizona in 1998 and 2006. No cactus ferruginous pygmy-owls used the nest boxes in these studies, but low cavity availability was confirmed based on high use of the nest boxes by other species, including screech owls. No additional nest box studies have been undertaken in Arizona, and the nest box study in Texas is no longer active.

Captive Breeding and Population Augmentation

A pygmy-owl captive-breeding feasibility study was initiated by the AGFD in partnership with the Wild at Heart raptor care facility in Cave Creek, Arizona, in 2006. Since then, Wild at Heart has been researching and testing protocols for a managed breeding program for cactus ferruginous pygmy-owls. In 2017, the Phoenix Zoo became the second captive breeding site for pygmy-owls in Arizona and part of the managed breeding program when it entered into partnership with the Service and the AGFD. Both the AGFD and the Service oversee this program.

The goal of the managed breeding program for the cactus ferruginous pygmy-owl is to develop appropriate protocols for the husbandry and breeding of captive pygmy-owls to provide individuals to augment existing population groups or establish new population groups in areas where suitable habitat exists in Arizona (AGFD 2015, entire). To date, these efforts have demonstrated: (a) Successful capture and transport of wild cactus ferruginous pygmy-owls; (b) safe, healthy, and stress-free captive facilities; (c) the development of appropriate care, feeding, and maintenance protocols; (d) successful breeding; and (e) appropriate care and development of young-of-the-year birds. Three pilot releases of captive-bred pygmy-owls have been implemented since the inception of this program. This effort establishes the first formal captive-breeding for the subspecies and provides the groundwork for evaluation of this strategy in wild cactus ferruginous

pygmy-owl population augmentation. These pilot releases have not resulted in the establishment of new pygmy-owl territories or population groups, but have contributed valuable information to developing appropriate release strategies and protocols to improve the potential for conservation benefits to the pygmy-owl in the future.

Conservation Planning

When the pygmy-owl was listed previously, several municipalities located within current or historical pygmy-owl activity areas explored or implemented habitat conservation plans (HCPs) under the Act to address potential conflicts between development projects and requirements of the Act. These HCP plans included the Sonoran Desert Conservation Plan (Multi-Species Conservation Plan) developed by Pima County (Pima County 2016, entire), the Town of Marana HCP (Town of Marana 2009, entire), and the City of Tucson's Avra Valley (City of Tucson 2019, entire) and Southlands HCPs (City of Tucson 2013, entire). Each of these four HCP efforts identified the cactus ferruginous pygmy-owl as one of the covered species within their plans. However, most of these plans have yet to be completed: to date, only the Pima County HCP has been completed and is being implemented. Pima County is currently conducting ongoing surveys and monitoring of pygmy-owl territories on county-managed lands and has set aside pygmy-owl habitat as part of their conservation lands system in compliance with their HCP. The establishment of these conservation lands is an important contribution to pygmy-owl conservation in Pima County, but continuing efforts are needed to address other threats such as habitat impacts from climate change. Pima County's efforts are expected to continue for the 30-year life of their permit (through 2046) and longer if the County renews the permit.

Another ongoing conservation planning effort that has the potential to support pygmy-owl conservation in the Altar Valley of southern Arizona is the Altar Valley Watershed Management Plan. This plan being developed by the Altar Valley

Conservation Alliance with numerous partners and participants builds upon existing efforts within the Altar Valley to restore and enhance the watershed. The plan will describe stewardship practices and identify a series of high-priority projects that maximize positive impacts on the land. While this planning effort has yet to be completed, projects related to watershed restoration have been implemented at three ranches in the Altar Valley. These projects have included one-rock dams and other structures to stabilize waterways, road grading to promote water harvesting, and enhancement of grasslands through invasive species control to promote infiltration and reduce runoff and sedimentation. These actions improve vegetation health through increased water infiltration and reduce loss of soil and vegetation due to erosion. Specific benefits occur to riparian vegetation along drainages enhancing pygmy-owl habitat conditions and connectivity.

In Mexico, there are Federal, State, or municipal protected areas which comprise approximately 11 percent of the historical pygmy-owl range in Mexico. These areas can work well as conservation strategies for the cactus ferruginous pygmy-owl. There is now a new option for protected areas called Voluntary Conservation Areas (Áreas Destinadas Voluntariamente a la Conservación; ADVA), which are areas identified for conservation. These ADVA could be a potential conservation strategy for the pygmy-owl in the future (Enríquez 2021, pers. comm.).

Determination of Cactus Ferruginous Pygmy-owl's Status

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species meets the definition of an “endangered species” or a “threatened species.” The Act defines an “endangered species” as a species in danger of extinction throughout all or a significant portion of its range, and a “threatened species” as a species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The Act

requires that we determine whether a species meets the definition of an “endangered species” or a “threatened species” because of any of the following factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence.

Status Throughout All of Its Range

We examined the following threats to the cactus ferruginous pygmy-owl: climate change and climate condition (Factor E), habitat loss and fragmentation (Factor A), human activities and disturbance (Factors B and E), human-caused mortality (Factors B and E), disease and predation (Factor C), and small population size (Factor E), and we determined that the primary threats to the subspecies are climate change and climate condition, and habitat loss and fragmentation. Existing regulatory mechanisms (Factor D) and conservation efforts do not address the threats to the cactus ferruginous pygmy-owl to the extent that listing the subspecies is not warranted.

Population resiliency is highly variable across the range of the pygmy-owl. Overall, three analysis units maintain a moderate level of resiliency, with western Mexico maintaining a high level of resiliency and Arizona with a low level of resiliency. Therefore, the majority of the analysis units we examined maintain some ability to withstand stochastic events. Additionally, the western Mexico and northeast Mexico analysis units are estimated to support tens of thousands of pygmy-owls. Due to the broad geographic distribution and network of population groups that are connected within and between some analysis units throughout most of its range, the pygmy-owl has some ability to recolonize following catastrophic events and is considered to have adequate redundancy. Additionally, the cactus ferruginous pygmy-owl currently has high genetic and ecological variability across the range. This ecological diversity provides the

subspecies with sufficient representation and may allow the pygmy-owl to adapt to, and survive, future environmental change.

After evaluating threats to the subspecies and assessing the cumulative effect of the threats under the Act's section 4(a)(1) factors, we conclude that the risk factors acting on the cactus ferruginous pygmy-owl and its habitat, either singly or in combination, are not of sufficient imminence, intensity, or magnitude to indicate that the subspecies is in danger of extinction now (an endangered species) throughout all of its range. Despite current stressors, the subspecies currently maintains adequate resiliency, redundancy, and representation across the range such that the subspecies is currently able to withstand stochastic and catastrophic events and maintain adequate genetic and ecological variation throughout its range.

However, our analysis of the cactus ferruginous pygmy-owl's future conditions shows that the threats to the subspecies are likely to continue into the future, resulting in continued loss and fragmentation of habitat putting the species at risk of extinction within the foreseeable future.

Under all future scenarios, we project a continued reduction in species viability throughout the range of the subspecies due to climate change, habitat loss, and habitat fragmentation. In 30 years, even under our most optimistic scenario, the reduced effects scenario, there will be no analysis units in high condition. This represents a decrease from current conditions with one analysis unit declining from high to moderate condition, and one analysis unit declining from moderate to low condition. Additionally, despite maintaining their current condition categories over the next 30 years, habitat and demographic conditions within the other three analysis units continue to decline. Over the next 30 years, many of the analysis units will become increasingly vulnerable to extirpation through the degradation of habitat conditions. We anticipate that urbanization and development will continue under all future scenarios and in all analysis units.

Invasive species will continue to spread into pygmy-owl habitat in most analysis units and deforestation and wood harvesting will continue in all three analysis units in Mexico. Continued loss and degradation of pygmy-owl habitat will reduce overall species resiliency, impeding the ability of the subspecies to withstand stochastic events and increasing the risk of extirpation following such events. The loss of population groups will lead to a reduction in representation, reducing the subspecies' ability to adapt over time to changes in the environment, such as climate changes. This expected reduction in both the number and distribution of sufficiently resilient population groups will reduce redundancy and impede the ability of the subspecies to recolonize following catastrophic disturbance. Thus, after assessing the best available information, we conclude that the cactus ferruginous pygmy-owl is not currently in danger of extinction but is likely to become in danger of extinction within the foreseeable future throughout all of its range.

Status Throughout a Significant Portion of Its Range

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so in the foreseeable future throughout all or a significant portion of its range. The court in *Center for Biological Diversity v. Everson*, 2020 WL 437289 (D.D.C. Jan. 28, 2020) (*Center for Biological Diversity*), vacated the aspect of the Final Policy on Interpretation of the Phrase “Significant Portion of Its Range” in the Endangered Species Act’s Definitions of “Endangered Species” and “Threatened Species” (79 FR 37578; July 1, 2014) that provided that the Service does not undertake an analysis of significant portions of a species’ range if the species warrants listing as threatened throughout all of its range. Therefore, we proceed to evaluating whether the species is endangered in a significant portion of its range—that is, whether there is any portion of the species’ range for which both (1) the portion is significant; and (2) the species is in danger of extinction in that portion. Depending on the case, it might be more efficient for us to address the “significance” question or the “status” question

first. We can choose to address either question first. Regardless of which question we address first, if we reach a negative answer with respect to the first question that we address, we do not need to evaluate the other question for that portion of the species' range.

Following the court's holding in *Center for Biological Diversity*, we now consider whether there are any significant portions of the species' range where the species is in danger of extinction now (i.e., endangered). In undertaking this analysis for cactus ferruginous pygmy-owl, we choose to address the status question first—we consider information pertaining to the geographic distribution of both the species and the threats that the species faces to identify any portions of the range where the species is endangered.

The statutory difference between an endangered species and a threatened species is the timeframe in which the species becomes in danger of extinction; an endangered species is in danger of extinction now while a threatened species is not in danger of extinction now but is likely to become so in the foreseeable future. Thus, we reviewed the best scientific and commercial data available regarding the time horizon for the threats that are driving the cactus ferruginous pygmy-owl to warrant listing as a threatened species throughout all of its range. We considered whether the threats are geographically concentrated in any portion of the species' range in a way that would accelerate the time horizon for the species' exposure or response to the threats. We examined the following threats: climate change and climate condition (Factor E) and habitat loss and fragmentation (Factor A), including cumulative effects.

We found a concentration of threats, i.e., the impacts of climate change, urbanization, and invasive species, in the Sonoran Desert Ecoregion, which extends from Arizona south into Sonora, Mexico. Climate change impacts to the pygmy-owl in the Sonoran Desert Ecoregion are likely to include loss of vegetation cover, reduced prey

availability, increased predation, reduced nest site availability, and vegetation community change. For example, models predict that the distribution of suitable habitat for saguaros, the primary pygmy-owl nesting substrate within the Sonoran Desert Ecoregion, will substantially decrease over the next 50 years under a moderate climate change scenario (Weiss and Overpeck 2005, p. 2074; Thomas et al. 2012, p. 43).

Climate models project that, by the end of the 21st century, the Sonoran Desert will experience an increase in drought conditions with a transition to a drier and more arid climate (Seager et al. 2007, p. 9; Cook et al. 2015, p. 6; Pascale et al. 2017, p. 806; Williams et al. 2020, p. 317). Given that this portion of the pygmy-owl's overall range is already characterized by arid and hot conditions and is in the midst of an extended drought, the effects from climate change represent a higher concentration of effects than in other portions of the pygmy-owl's range, which generally are characterized by higher precipitation and lower temperatures resulting in a baseline of higher greenness and vegetation health. In general, annual precipitation in the Sonoran Desert is positively correlated to pygmy-owl productivity (Flesch et al. 2015, p. 26). Timing and quantity of precipitation affects lizard and rodent abundance in ways that suggest rainfall is an important driver of prey population and community dynamics. In general, cool-season rainfall is positively correlated with rodent populations and warm-season rainfall is positively correlated with lizard populations. Projected increases in variability and decreases in quantity of precipitation will likely lead to a decrease in prey abundance for the pygmy-owl (Jones 1981, p. 111; Flesch 2008, p. 5; Flesch et al. 2015, p. 26).

Urban expansion and human population growth trends are expected to continue in the Sonoran Desert Ecoregion. The Maricopa-Pima-Pinal County areas of Arizona are expected to see the population grow by as much as 132 percent between 2005 and 2050, creating rural-urban edge effects across thousands of acres of pygmy-owl habitat (AECOM 2011, p. 13).

The population along the U.S.–Mexico border region from Texas to California is expected to double by 2025 (HHS 2017, p. 1). In Arizona, the border counties are projected to increase by 60 percent to 2.5 million by 2050 (OEO 2021, unpaginated). In Sonora the population is projected to reach 3.5 million by 2030 (CONAPO 2014, p. 25). Development is focused along the border and this area of northern Mexico has faster population growth than other Mexican states (Pineiro 2001, pp. 1–2). This development focuses potential barriers or impediments to pygmy-owl movements in a region that is important for demographic support (immigration events and gene flow) of pygmy-owl population groups, including movements such as dispersal. If urban expansion and development continues as expected, it will encompass a substantial portion of the current distribution of the pygmy-owl in the Sonoran Desert Ecoregion.

The invasion of nonnative vegetation, particularly nonnative grasses, has altered the natural fire regime over the Sonoran Desert Ecoregion portion of the pygmy-owl's range. Buffelgrass is prevalent and increasing throughout much of this portion of the pygmy-owl's range, leading to increased fire frequency in a system that is not adapted to fire (Schmid and Rogers 1988, p. 442; D'Antonio and Vitousek 1992, p. 73; Burquez and Quintana 1994, p. 23; Halverson and Guertin 2003, p. 13; Van Devender and Dimmit 2006, p. 5). While a single fire in an area may or may not produce long-term reductions in plant cover or biomass, repeated wildfires in a given area are capable of ecosystem type-conversion from native desert scrub to nonnative annual grassland. These repeated fires may render the area unsuitable for pygmy-owls and other native wildlife due to the loss of trees and columnar cacti, and reduced diversity of cover and prey species (Brooks and Esque 2002, p. 336).

Despite the current concentration of threats and their increasing effects to pygmy-owls and pygmy-owl habitat, the Sonoran Desert Ecoregion currently supports an abundance of pygmy-owls in the high hundreds and a moderate amount of intact, suitable

vegetation. Consequently, these factors are currently maintaining an overall moderate level of resiliency in this portion of the range. Additionally, there is currently habitat connectivity with evidence of pygmy-owl movement among population groups, providing redundancy throughout the Sonoran Desert Ecoregion. Representation is also currently being maintained through pygmy-owl occupancy of a variety of vegetation types throughout the Sonoran Desert Ecoregion with gene flow among these population groups. However, under all three future scenarios, this portion of the range is expected to become less resilient due to continued habitat fragmentation and the effects of climate change on habitat conditions, resulting in a reduction of pygmy-owl abundance and occupancy. These deteriorating conditions are also anticipated to result in declines in redundancy and representation through the loss of population groups within the Ecoregion.

Although some threats to the cactus ferruginous pygmy-owl are concentrated in the Sonoran Desert Ecoregion, the best scientific and commercial data available does not indicate that the concentration of threats, or the species' responses to the concentration of threats, are likely to accelerate the time horizon in which the species becomes in danger of extinction in that portion of its range. As a result, the cactus ferruginous pygmy-owl is not in danger of extinction now in the Sonoran Desert Ecoregion. However, we do find that the species is likely to become in danger of extinction within the foreseeable future throughout all of its range. This finding is consistent with the courts' holdings in *Desert Survivors v. Department of the Interior*, No. 16-cv-01165-JCS, 2018 WL 4053447 (N.D. Cal. Aug. 24, 2018), and *Center for Biological Diversity v. Jewell*, 248 F. Supp. 3d, 946, 959 (D. Ariz. 2017).

Determination of Status

Our review of the best available scientific and commercial information indicates that the cactus ferruginous pygmy-owl meets the Act's definition of a threatened species.

Therefore, we propose to list the cactus ferruginous pygmy-owl as a threatened species in accordance with sections 3(20) and 4(a)(1) of the Act.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened species under the Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing results in public awareness, and conservation by Federal, State, Tribal, and local agencies, private organizations, and individuals. The Act encourages cooperation with the States and other countries and calls for recovery actions to be carried out for listed species. The protection required by Federal agencies and the prohibitions against certain activities are discussed, in part, below.

The primary purpose of the Act is the conservation of endangered and threatened species and the ecosystems upon which they depend. The ultimate goal of such conservation efforts is the recovery of these listed species, so that they no longer need the protective measures of the Act. Section 4(f) of the Act calls for the Service to develop and implement recovery plans for the conservation of endangered and threatened species. The recovery planning process involves the identification of actions that are necessary to halt or reverse the species' decline by addressing the threats to its survival and recovery. The goal of this process is to restore listed species to a point where they are secure, self-sustaining, and functioning components of their ecosystems.

Recovery planning consists of preparing draft and final recovery plans, beginning with the development of a recovery outline and making it available to the public within 30 days of a final listing determination. The recovery outline guides the immediate implementation of urgent recovery actions and describes the process to be used to develop a recovery plan. Revisions of the plan may be done to address continuing or new threats to the species, as new substantive information becomes available. The recovery

plan also identifies recovery criteria for review of when a species may be ready for reclassification from endangered to threatened (“downlisting”) or removal from protected status (“delisting”) and methods for monitoring recovery progress. Recovery plans also establish a framework for agencies to coordinate their recovery efforts and provide estimates of the cost of implementing recovery tasks. Recovery teams (composed of species experts, Federal and State agencies, nongovernmental organizations, and stakeholders) are often established to develop recovery plans. If we adopt this rule as proposed, when completed, the recovery outline, draft recovery plan, and the final recovery plan for the cactus ferruginous pygmy-owl will be available on our website (<http://www.fws.gov/endangered>), or from our Arizona Ecological Services Office (see **FOR FURTHER INFORMATION CONTACT**).

Implementation of recovery actions generally requires the participation of a broad range of partners, including other Federal agencies, States, Tribes, nongovernmental organizations, businesses, and private landowners. Examples of recovery actions include habitat restoration (e.g., restoration of native vegetation), research, captive propagation and reintroduction, and outreach and education. The recovery of many listed species cannot be accomplished solely on Federal lands because their range may occur primarily or solely on non-Federal lands. To achieve recovery of these species requires cooperative conservation efforts on private, State, and Tribal lands.

If this species is listed, funding for recovery actions will be available from a variety of sources, including Federal budgets, State programs, and cost-share grants for non-Federal landowners, the academic community, and nongovernmental organizations. In addition, pursuant to section 6 of the Act, the States of Arizona and Texas would be eligible for Federal funds to implement management actions that promote the protection or recovery of the cactus ferruginous pygmy-owl. Information on our grant programs that are available to aid species recovery can be found at: <http://www.fws.gov/grants>.

Section 8(a) of the Act (16 U.S.C. 1537(a)) authorizes the provision of limited financial assistance for the development and management of programs that the Secretary of the Interior determines to be necessary or useful for the conservation of endangered or threatened species in foreign countries. Sections 8(b) and 8(c) of the Act (16 U.S.C. 1537(b) and (c)) authorize the Secretary to encourage conservation programs for foreign listed species, and to provide assistance for such programs, in the form of personnel and the training of personnel.

Although the cactus ferruginous pygmy-owl is only proposed for listing under the Act at this time, please let us know if you are interested in participating in recovery efforts for this subspecies. Additionally, we invite you to submit any new information on this subspecies whenever it becomes available and any information you may have for recovery planning purposes (see **FOR FURTHER INFORMATION CONTACT**).

Section 7(a) of the Act requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as an endangered or threatened species and with respect to its critical habitat, if any is designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any action that is likely to jeopardize the continued existence of a species proposed for listing or result in destruction or adverse modification of proposed critical habitat. If a species is listed subsequently, section 7(a)(2) of the Act requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of the species or destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into consultation with the Service.

Federal agency actions within the species' habitat that may require conference or consultation or both as described in the preceding paragraph include management and

any other landscape-altering activities on Federal lands administered, or on private lands seeking funding, by Federal agencies, which may include, but are not limited to, the Department of the Interior's U.S. Fish and Wildlife Service, Bureau of Land Management, and National Park Service (Organ Pipe Cactus National Monument and Ironwood Forest National Monument); the Department of Defense's (Barry M. Goldwater Air Force Range) and U.S. Army Corps of Engineers (for issuance of section 404 Clean Water permits); the U.S. Department of Agriculture's U.S. Forest Service, Natural Resources Conservation Service, and Farm Service Agency; and construction and maintenance of roads or highways by the Federal Highway Administration.

It is our policy, as published in the *Federal Register* on July 1, 1994 (59 FR 34272), to identify to the maximum extent practicable at the time a species is listed, those activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of a proposed listing on proposed and ongoing activities within the range of the species proposed for listing. The discussion below regarding protective regulations under section 4(d) of the Act complies with our policy.

II. Proposed Rule Issued Under Section 4(d) of the Act

Background

Section 4(d) of the Act contains two sentences. The first sentence states that the Secretary shall issue such regulations as he [or she] deems necessary and advisable to provide for the conservation of species listed as threatened. The U.S. Supreme Court has noted that statutory language like "necessary and advisable" demonstrates a large degree of deference to the agency (see *Webster v. Doe*, 486 U.S. 592 (1988)). Conservation is defined in the Act to mean the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary. Additionally, the second sentence

of section 4(d) of the Act states that the Secretary may by regulation prohibit with respect to any threatened species any act prohibited under section 9(a)(1), in the case of fish or wildlife, or section 9(a)(2), in the case of plants. Thus, the combination of the two sentences of section 4(d) provides the Secretary with wide latitude of discretion to select and promulgate appropriate regulations tailored to the specific conservation needs of the threatened species. The second sentence grants particularly broad discretion to the Service when adopting the prohibitions under section 9.

The courts have recognized the extent of the Secretary's discretion under this standard to develop rules that are appropriate for the conservation of a species. For example, courts have upheld rules developed under section 4(d) as a valid exercise of agency authority where they prohibited take of threatened wildlife, or include a limited taking prohibition (see *Alsea Valley Alliance v. Lautenbacher*, 2007 U.S. Dist. Lexis 60203 (D. Or. 2007); *Washington Environmental Council v. National Marine Fisheries Service*, 2002 U.S. Dist. Lexis 5432 (W.D. Wash. 2002)). Courts have also upheld 4(d) rules that do not address all of the threats a species faces (see *State of Louisiana v. Verity*, 853 F.2d 322 (5th Cir. 1988)). As noted in the legislative history when the Act was initially enacted, "once an animal is on the threatened list, the Secretary has an almost infinite number of options available to him [or her] with regard to the permitted activities for those species. He [or she] may, for example, permit taking, but not importation of such species, or he [or she] may choose to forbid both taking and importation but allow the transportation of such species" (H.R. Rep. No. 412, 93rd Cong., 1st Sess. 1973).

Exercising this authority under section 4(d), we have developed a proposed rule that is designed to address the cactus ferruginous pygmy-owl's conservation needs. Although the statute does not require us to make a "necessary and advisable" finding with respect to the adoption of specific prohibitions under section 9, we find that this proposed rule as a whole satisfies the requirement in section 4(d) of the Act to issue regulations

deemed necessary and advisable to provide for the conservation of the cactus ferruginous pygmy-owl. Because of the large geographic range of the cactus ferruginous pygmy-owl, different portions of the geographic range are affected by different types and extent of threats and stressors. Therefore, it is feasible that exceptions under this proposed 4(d) rule may be different for the different analysis units described in the SSA report. We encourage public comment providing support for the potential application of different exceptions in different portions of the cactus ferruginous pygmy-owl's geographic range.

As discussed above under **Summary of Biological Status and Threats**, we have concluded that the cactus ferruginous pygmy-owl is likely to become in danger of extinction within the foreseeable future primarily due to a loss of vegetation cover, reduced prey availability, increased predation, reduced nest site availability, and vegetation community change resulting from ongoing climate change, particularly increases in drought conditions, as well as due to habitat loss and fragmentation stemming from urbanization, agriculture, deforestation, and invasive species. This proposed 4(d) rule identifies the prohibitions needed to conserve the cactus ferruginous pygmy-owl.

We considered the range of potential activities that may potentially affect the cactus ferruginous pygmy-owl's status and viability. There is a very wide range of such potential activities including, but not limited to, commercial and residential development, infrastructure development and maintenance, utility work, activities related to border infrastructure and enforcement, grazing and ranching activities, activities conducted under Clean Water Act permits, mining, flood control activities, recreation, and activities conducted under land management plans. There is also a wide range of factors that affect the implementation of each of these activity types resulting in unique circumstances that we considered in developing proposed 4(d) rule exceptions. Ultimately, we find that it is

appropriate to extend the standard section 9 prohibitions for endangered species to the cactus ferruginous pygmy-owl in order to conserve the subspecies.

However, while developing this proposed 4(d) rule, the Service considered exceptions to the standard section 9 prohibitions for endangered species that would facilitate essential conservation actions needed for the cactus ferruginous pygmy-owl. We consider essential conservation efforts to include facilitating surveys and monitoring of cactus ferruginous pygmy-owl population groups; enabling research to better understand cactus ferruginous pygmy-owl's needs and stressors (including the use of nest boxes and captive breeding); conducting education and outreach activities to increase public awareness and support of cactus ferruginous pygmy-owl conservation and recovery; and encouraging management of the landscape in ways that meet both land management considerations and the conservation needs of the cactus ferruginous pygmy-owl. Such land management considerations potentially include restoration and habitat improvement actions (including nonnative, invasive species management), watershed improvements, and grazing management that is compatible with cactus ferruginous pygmy-owl habitat enhancement and restoration, provided pygmy-owl habitat enhancement and restoration is identified as a significant outcome of the management actions and such actions are coordinated with the Service.

For the purposes of this proposed rule and our SSA analysis, we consider surveying and monitoring activities necessary to understand and implement cactus ferruginous pygmy-owl conservation and recovery. We currently lack data on the current numbers, density, and distribution of the cactus ferruginous pygmy-owl across its defined geographic range in both the United States and Mexico. We also lack comprehensive data on the productivity, survival, mortality, and other natural-history characteristics of the cactus ferruginous pygmy-owl. Such data have been gathered historically, but only in local areas and primarily only in the United States and northern Sonora. Where we have

data on occurrence, numbers, density, and natural-history variables, they allow us to better understand the status of the cactus ferruginous pygmy-owl and what actions are necessary to conserve population groups and enhance status and viability. Surveying and monitoring activities can result in short-term effects to cactus ferruginous pygmy-owls and, potentially, in the take of individuals and nest sites. We want to encourage more comprehensive and widespread surveying and monitoring activities across the geographic range of the cactus ferruginous pygmy-owl, and thus, we are considering providing an exception for this action in the 4(d) rule. This exception could occur by recognizing State authority to issue a permit to conduct call broadcast surveys and monitoring and nest monitoring for listed species. This state permitting would ensure oversight for surveyor and monitor qualifications, as well as data submission to the State agencies. Thus, an exception to the prohibitions of take could be granted under the 4(d) rule if the surveyors and monitors possessed a valid state permit, if required. If a State permit is not required to conduct call broadcast surveys and monitoring and nest monitoring, such activities could require a Federal 10(a)(1)(A) permit. We are considering this approach to recognize State authorities and streamline permitting processes. This exception would not cover any activities that involve the handling of pygmy-owls. We encourage public and agency comments related to our consideration of using the State permitting process in the 4(d) rule as the basis of an exception to the prohibitions on take related to pygmy-owl survey and monitoring activities.

Similar to surveying and monitoring, research related to all aspects of cactus ferruginous pygmy-owl natural history are needed to fill in information gaps and improve our understanding of the needs and stressors of the cactus ferruginous pygmy-owl to be able to identify and implement effective conservation and recovery actions. This includes research into the effectiveness of a managed breeding program for the pygmy-owl.

Because research that involves the capture, handling, marking, human care, tissue sample collection, etc., of pygmy-owls may result in the direct take of cactus ferruginous pygmy-owls, it is necessary to require those implementing these actions to have the appropriate background, expertise, and equipment and materials to implement these activities. We find that these activities are best administered through our section 10 permitting process (under the Act's section 10(a)(1)(A)). This permitting process allows us to assess the appropriateness of the proposed projects and activities with regard to promoting the conservation of the cactus ferruginous pygmy-owl; ensure the competency of those conducting the activities; reduce the potential for redundancy of effort and overlapping effects to cactus ferruginous pygmy-owls; and facilitate the opportunity to receive, analyze, and incorporate the most current information into conservation and recovery actions.

Restoration and habitat improvement actions are those actions that convert areas that are otherwise not habitat for the cactus ferruginous pygmy-owl to areas that are cactus ferruginous pygmy-owl habitat or actions that improve areas of lesser quality cactus ferruginous pygmy-owl habitat to areas of higher quality cactus ferruginous pygmy-owl habitat. These actions are essential for the subspecies, as this is the only way to offset habitat loss and fragmentation. For the cactus ferruginous pygmy-owl, the primary restoration or habitat improvement actions include, but are not limited to, placement of nest boxes, restoration of native species, establishment or protection of nesting substrates (large trees and columnar cacti), invasive species control, riparian enhancement, water developments, watershed improvements, improved habitat connectivity, and fire management. Because we want to encourage the implementation of cactus ferruginous pygmy-owl habitat restoration and enhancement, we are proposing in the 4(d) rule an exemption to the take of cactus ferruginous pygmy-owls that may result from such activities, as described below. In order to receive this exemption, the habitat

restoration and improvement projects must be coordinated with, and receive approval from, the Service prior to work commencing.

Education and outreach activities allow cactus ferruginous pygmy-owl conservation partners to present information to various segments of the public related to ongoing conservation and management activities and programs. Public awareness of the cactus ferruginous pygmy-owl's biology, ecology, and threats helps foster support for recovery program activities across the geographic range of the cactus ferruginous pygmy-owl. Increasing the prevailing understanding of how recovery activities for the cactus ferruginous pygmy-owl improve the health, function, and quality of the environments where they are found, as well as the human communities located in proximity to occupied cactus ferruginous pygmy-owl habitat, will strengthen support for continued conservation of the pygmy-owl and for the habitats upon which it depends. Education and outreach will also serve to counteract incorrect narratives that conservation of the cactus ferruginous pygmy-owl is responsible for preventing activities and development that positively affect the area's social and economic well-being. Allowing the public to personally see pygmy-owls through the use of educational animals can result in take of individuals. The potential for this type of take is already addressed through the issuance of a Migratory Bird Treaty Act (MBTA) permit and we are proposing to streamline permitting by acknowledging the existing MBTA process in this proposed 4(d) rule. Such education and outreach programs can increase public awareness, engagement, and support for cactus ferruginous pygmy-owl conservation and recovery. Such benefits outweigh the effects to individual pygmy-owls.

Finally, we considered the need for compatibly managed grazing activities that result in the vegetation structure and composition needed to support the cactus ferruginous pygmy-owl. The habitat needs for the cactus ferruginous pygmy-owl vary across the subspecies' geographic range, and grazing can affect these habitats in different

ways. It is important that grazing is managed at a given site to account for a variety of factors specific to the local ecological site, including past management, soils, precipitation, and other factors, to ensure that the resulting vegetative composition and structure will support the cactus ferruginous pygmy-owl. Grazing management that has altered the vegetation community to a point where the composition and structure are no longer suitable for cactus ferruginous pygmy-owls can contribute to habitat loss and fragmentation within the landscape, even though these areas may remain as open space on the landscape. Livestock grazing, however, is not inherently detrimental to the cactus ferruginous pygmy-owl, provided that grazing management results in a plant community with species and structural diversity suitable for the cactus ferruginous pygmy-owl. When livestock grazing is managed compatibly, it can be an invaluable tool for managing healthy vegetation communities benefiting the cactus ferruginous pygmy-owl.

While developing this proposed 4(d) rule, we determined that grazing management has to occur on the local level, and thus broad determinations within this proposed 4(d) rule would not be beneficial to the species or local land managers. While the 4(d) rule was one approach considered to promote conservation of the cactus ferruginous pygmy-owl by encouraging management of vegetation communities in ways that support both long-term viability of livestock enterprises and concurrent conservation of pygmy-owls, we determined that other mechanisms under our authorities would be more appropriate to support this action. Besides a 4(d) rule, other mechanisms supporting conservation opportunities exist in other portions of the Act and our policies, including under the Act's section 7(a) (Federal Agency Actions and Consultations), the Act's section 10(a) (Permits), and our conservation banking program. We recognize the value of compatibly managed grazing for the cactus ferruginous pygmy-owl, and we look forward to working with our partners and local land managers to ensure there are viable conservation options that provide regulatory coverage for interested landowners. We

encourage public comments related to the issue of properly managed grazing and the appropriate best approach for addressing livestock grazing and management within the range of tools available.

As indicated above, the provisions of this proposed 4(d) rule are one of many tools that we would use to promote the conservation of the cactus ferruginous pygmy-owl. This proposed 4(d) rule would apply only if and when we make final the listing of the cactus ferruginous pygmy-owl as a threatened species.

Section 7(a)(2) of the Act requires Federal agencies, including the Service, to ensure that any action they fund, authorize, or carry out is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of designated critical habitat of such species. In addition, section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any agency action which is likely to jeopardize the continued existence of any species proposed to be listed under the Act or result in the destruction or adverse modification of proposed critical habitat.

If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency (action agency) must enter into consultation with us. Examples of actions that are subject to the section 7 consultation process are actions on State, Tribal, local, or private lands that require a Federal permit (such as a permit from the U.S. Army Corps of Engineers under section 404 of the Clean Water Act (33 U.S.C. 1251 *et seq.*) or a permit from the Service under section 10 of the Act) or that involve some other Federal action (such as funding from the Federal Highway Administration, Federal Aviation Administration, or the Federal Emergency Management Agency). Federal actions not affecting listed species or critical habitat—and actions on State, Tribal, local, or private lands that are not federally funded, authorized, or carried out by a Federal agency—do not require section 7 consultation.

This obligation does not change in any way for a threatened species with a species-specific 4(d) rule. Actions that result in a determination by a Federal agency of “not likely to adversely affect” continue to require the Service’s written concurrence and actions that are “likely to adversely affect” a species require formal consultation and the formulation of a biological opinion.

Provisions of the Proposed 4(d) Rule

This proposed 4(d) rule would provide for the conservation of the cactus ferruginous pygmy-owl by prohibiting the following activities, except as otherwise authorized or permitted: importing or exporting; take; possession and other acts with unlawfully taken specimens; delivering, receiving, transporting, or shipping in interstate or foreign commerce in the course of commercial activity; or selling or offering for sale in interstate or foreign commerce. In addition, anyone taking, attempting to take, or otherwise possessing a cactus ferruginous pygmy-owl, or parts thereof, in violation of section 9 of the Act would be subject to a penalty under section 11 of the Act, with certain exceptions (discussed below).

Under the Act, “take” means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Some of these provisions have been further defined in regulations at 50 CFR 17.3. Take can result knowingly or otherwise, by direct and indirect impacts, intentionally or incidentally. Regulating take that occurs incidental to otherwise lawful activities (section 7 consultations with Federal action agencies) would help to conserve and recover the cactus ferruginous pygmy-owl by evaluating the potential of various activities to adversely affect or otherwise decrease the viability of the cactus ferruginous pygmy-owl. As mentioned above, a wide variety of lawful activities and projects have the potential to negatively affect the viability of this subspecies: Disturbance, loss and fragmentation of habitat, reduction of prey species, loss of nesting substrates, introduction of nonnative

predators and competitors, and other similar effects. By regulating these types of activities and projects, we can conserve the subspecies' remaining habitat and populations; slow the rate of habitat loss and fragmentation; slow the subspecies' rate of decline; and decrease synergistic, negative effects from other ongoing future threats.

Conversely, allowing incidental and intentional take for certain activities allow us to promote pygmy-owl conservation and improve pygmy-owl habitat. For example, habitat restoration and improvement works to offset losses and fragmentation of habitat from factors related to climate change and human land uses on the landscape. Education and outreach efforts help to increase public awareness and understanding and to garner support for conservation and recovery of the cactus ferruginous pygmy-owl. Thus, benefits to the cactus ferruginous pygmy-owl are derived both from regulating certain sources of potential take and by excepting certain take for activities where benefits outweigh the short-term effects of the take on cactus ferruginous pygmy-owl populations.

As discussed above under **Summary of Biological Status and Threats**, the loss of vegetation cover, reduced prey availability, increased predation, reduced nest site availability, and vegetation community change resulting from ongoing climate change, particularly increases in drought conditions, and habitat loss and fragmentation stemming from urbanization, agriculture, deforestation, and invasive species are affecting the status of the cactus ferruginous pygmy-owl. We have identified various activities that have the potential to help us understand and offset the activities affecting the cactus ferruginous pygmy-owl's viability. Therefore, a range of conservation activities, including education and outreach related to cactus ferruginous pygmy-owl recovery, and management of the landscape in ways that meet both land management considerations and the conservation needs of the cactus ferruginous pygmy-owl, have the potential to benefit the cactus ferruginous pygmy-owl. Such land management considerations potentially include restoration and habitat improvement actions, watershed improvements, and grazing

management that is compatible with cactus ferruginous pygmy-owl habitat enhancement and restoration, provided such habitat enhancement and restoration is identified as a significant outcome of the management actions and such actions are coordinated with the Service and appropriate State and Tribal agencies and landowners. Accordingly, this proposed 4(d) rule addresses activities to facilitate conservation and management of the cactus ferruginous pygmy-owl where the activities currently occur and may occur in the future by excepting the activities from the Act's take prohibition under certain specific conditions. These activities are intended to increase management flexibility and encourage support for conservation of, habitat restoration for, and habitat improvement for the cactus ferruginous pygmy-owl.

Under this proposed 4(d) rule, most take would be prohibited. Exceptions to the prohibitions on take would include some of the general exceptions allowed for take of endangered wildlife as set forth in 50 CFR 17.21 (see the rule portion of this document) and certain other specific activities that we propose for exception, as described below. The excepted activities would require approval by the Service or would have to be conducted under an existing, appropriate, valid permit issued under part 21 of title 50 of the Code of Federal Regulations, which governs species protected under the MBTA, as described below. These activities should be conducted in coordination with appropriate land management agencies; State, Tribal, and local agencies; and private landowners, as appropriate, and in support of any existing or future designated recovery programs guiding the conservation and recovery of the cactus ferruginous pygmy-owl. The following activities would be excepted from the take prohibitions for the pygmy-owl (i.e., take would be allowed for these activities) under this proposed 4(d) rule.

Education and Outreach

Education and outreach are a vital part of cactus ferruginous pygmy-owl recovery and progress towards achieving and maintaining viable populations of cactus ferruginous

pygmy-owls. This proposed 4(d) rule excepts from take prohibitions those cactus ferruginous pygmy-owl education and outreach activities undertaken for the purposes of increasing public awareness of cactus ferruginous pygmy-owl biology, ecology, or recovery needs, as well as of the positive effects of having pygmy-owls as a viable part of the local ecosystems on the local society, economy, and quality of life for communities. Such educational activities may include use of educational captive-reared cactus ferruginous pygmy-owls, pygmy-owl skins, or parts of pygmy-owls. These activities are typically covered by a permit issued under 50 CFR part 21, which governs species protected under the MBTA. To remove redundant permitting, this proposed 4(d) rule will cover incidental take resulting from educational and outreach activities, provided the researcher already holds an appropriate and valid MBTA permit issued under 50 CFR part 21. These activities can increase public awareness, engagement, and support for cactus ferruginous pygmy-owl conservation and recovery.

Education and outreach activities must be coordinated with the Service prior to commencing work. Coordination can occur in person, by phone, or through written communications. Education and outreach activities covered by this proposed 4(d) rule would have to be consistent with an existing designated recovery program, such as a final recovery plan, and benefit cactus ferruginous pygmy-owl conservation through increased public awareness and engagement, which supports cactus ferruginous pygmy-owl recovery. Education and outreach qualifying under this exception would not require a permit issued under section 10(a) of the Act.

Habitat Restoration and Enhancement

Incidental take resulting from habitat restoration or enhancement projects that improve the viability of cactus ferruginous pygmy-owl populations and population groups, and have been coordinated and approved by the Service, is excepted from the take prohibitions under this proposed 4(d) rule. Habitat restoration and enhancement

projects are needed to increase nest site (cavity) availability; improve habitat connectivity among cactus ferruginous pygmy-owl population groups; increase prey availability; improve vegetation structure and health; and decrease nonnative species, watershed degradation and erosion, and habitat loss or reduction due to extreme weather events and wildfire.

This proposed 4(d) rule excepts from take prohibitions those habitat restoration or enhancement activities with the primary or secondary purpose of improving cactus ferruginous pygmy-owl habitat conditions across the subspecies' geographical range. Specific habitat restoration or enhancement actions could include nest box installation; establishment or protection of nesting substrates (large trees or columnar cacti) to increase the availability of nest cavities; restoration or enhancement of native vegetation structure and species; control or eradication of invasive, nonnative species; riparian enhancement or restoration; water developments; watershed improvements; improved habitat connectivity; and fire management.

Prescribed fire within Sonoran Desert vegetation communities is not excepted in the proposed 4(d) rule. Fire can be an effective tool in maintaining ecosystem health, which is beneficial to the cactus ferruginous pygmy-owl, but Sonoran Desert vegetation communities are not fire-adapted, and use of fire in these vegetation communities must be carefully implemented or important pygmy-owl habitat elements can be lost or altered. Therefore, because of the risks associated with the loss or alteration of pygmy-owl habitat, the use of fire in Sonoran Desert vegetation communities is not excepted from the take prohibitions under this proposed 4(d) rule.

Woody vegetation communities provide the most important pygmy-owl habitat factors, particularly woodland tree canopy cover. Pygmy-owl habitat is not typically enhanced by actions that would remove woodland tree cover. Such actions would normally reduce vegetation cover diversity, pygmy-owl prey diversity, and important

predator avoidance and thermoregulatory cover for the pygmy-owl. Therefore, any action that would result in more than a minimal reduction or removal of tree cover (as determined during coordination with the Service) is not included under the habitat restoration or enhancement take exception in the proposed 4(d) rule.

Actions that promote the use of, or encourage the growth of, nonnative vegetation species are not exempted in the proposed 4(d) rule. Nonnative vegetation species can outcompete and replace native species that provide important habitat factors for the pygmy-owl. This outcome is particularly true when nonnative species form monocultures, resulting in low diversity and dense ground cover that alters natural fire regimes and reduces pygmy-owl prey diversity and availability.

In order to fall under the activities included under the habitat restoration or enhancement take exception in the proposed 4(d) rule, those persons implementing cactus ferruginous pygmy-owl habitat enhancement and restoration activities need written approval from the Service. Prior to approving proposed activities, the Service will coordinate with the appropriate entities (land management agencies, Tribal entities, private landowners, etc.).

For all forms of allowable take in the proposed 4(d) rule, reasonable care will be practiced to minimize the impacts from the actions. Reasonable care means limiting the impacts to cactus ferruginous pygmy-owl individuals and populations by complying with all applicable Federal, State, and Tribal regulations for the activity in question; using methods and techniques that result in the least harm, injury, or death, as feasible; undertaking activities at the least impactful times (e.g., conducting activities that might impact nesting cactus ferruginous pygmy-owls or nesting habitat only after nesting is concluded for the year) and locations, as feasible; procuring and implementing technical assistance from a qualified biologist on projects regarding all methods prior to the implementation of those methods; minimizing the number of individuals disturbed in the

existing wild population; implementing best management practices to ensure no disease or parasites are introduced or spread in pygmy-owl populations, including the proper use of quarantine and health evaluations; and preserving the genetic diversity of wild populations.

Permitting and Other Regulations To Cover Take

We may issue permits to carry out otherwise prohibited activities, including those described above, involving threatened wildlife under certain circumstances. Regulations governing permits are codified at 50 CFR 17.32. With regard to threatened wildlife, a permit may be issued for the following purposes: For scientific purposes, to enhance propagation or survival, for economic hardship, for zoological exhibition, for educational purposes, for incidental taking, or for special purposes consistent with the purposes of the Act. The statute also contains certain exemptions from the prohibitions, which are found in sections 9 and 10 of the Act.

We recognize the special and unique relationship with our State natural resource agency partners in contributing to conservation of listed species. State agencies often possess scientific data and valuable expertise on the status and distribution of endangered, threatened, and candidate species of wildlife and plants. State agencies, because of their authorities and their close working relationships with local governments and landowners, are in a unique position to assist the Service in implementing all aspects of the Act. In this regard, section 6 of the Act provides that the Service shall cooperate to the maximum extent practicable with the States in carrying out programs authorized by the Act. Therefore, any qualified employee or agent of a State conservation agency that is a party to a cooperative agreement with the Service in accordance with section 6(c) of the Act, who is designated by his or her agency for such purposes, would be able to conduct activities designed to conserve cactus ferruginous pygmy-owl that may result in otherwise prohibited take without additional authorization.

As described above, take can result by direct and indirect impacts, intentionally or incidentally. Section 7 of the Act regulates incidental take that occurs incidental to otherwise lawful activities, which have a nexus to a Federal action agency. Section 7(a)(2) of the Act requires Federal agencies, including the Service, to ensure that any action they fund, authorize, or carry out is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of designated critical habitat of such species. The Section 7 process helps to conserve and recover the cactus ferruginous pygmy-owl by evaluating the potential of various activities to adversely affect the cactus ferruginous pygmy-owl. Section 7 consultations ensure that Federal actions do not jeopardize the continued existence of the pygmy-owl and that proposed project activities include appropriate conservation measures or that reasonable and prudent measures are included to minimize the impacts of incidental take that is anticipated to result from implementing a project.

Nothing in this proposed 4(d) rule would change in any way the recovery planning provisions of section 4(f) of the Act, the consultation requirements under section 7 of the Act, or the ability of the Service to enter into partnerships for the management and protection of the cactus ferruginous pygmy-owl. However, interagency cooperation may be further streamlined through planned programmatic consultations for the species between Federal agencies and the Service, where appropriate. We ask the public, particularly State agencies and other interested stakeholders that may be affected by the proposed 4(d) rule, to provide comments and suggestions regarding additional guidance and methods that the Service could provide or use, respectively, to streamline the implementation of this proposed 4(d) rule (see **Information Requested**, above).

III. Critical Habitat

Background

Critical habitat is defined in section 3 of the Act as:

(1) The specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Act, on which are found those physical or biological features

(a) Essential to the conservation of the species, and

(b) Which may require special management considerations or protection; and

(2) Specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Our regulations at 50 CFR 424.02 define the geographical area occupied by the species as an area that may generally be delineated around species' occurrences, as determined by the Secretary (i.e., range). Such areas may include those areas used throughout all or part of the species' life cycle, even if not used on a regular basis (e.g., migratory corridors, seasonal habitats, and habitats used periodically, but not solely by vagrant individuals). Additionally, our regulations at 50 CFR 424.02 define the word "habitat," for the purposes of designating critical habitat only, as the abiotic and biotic setting that currently or periodically contains the resources and conditions necessary to support one or more life processes of a species.

Conservation, as defined under section 3 of the Act, means to use and the use of all methods and procedures that are necessary to bring an endangered or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, and transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, may include regulated taking.

Critical habitat receives protection under section 7 of the Act through the requirement that Federal agencies ensure, in consultation with the Service, that any action they authorize, fund, or carry out is not likely to result in the destruction or adverse modification of critical habitat. The designation of critical habitat does not affect land ownership or establish a refuge, wilderness, reserve, preserve, or other conservation area. Such designation also does not allow the government or public to access private lands. Such designation does not require implementation of restoration, recovery, or enhancement measures by non-Federal landowners. Where a landowner requests Federal agency funding or authorization for an action that may affect a listed species or critical habitat, the Federal agency would be required to consult with the Service under section 7(a)(2) of the Act. However, even if the Service were to conclude that the proposed activity would result in destruction or adverse modification of the critical habitat, the Federal action agency and the landowner are not required to abandon the proposed activity, or to restore or recover the species; instead, they must implement “reasonable and prudent alternatives” to avoid destruction or adverse modification of critical habitat.

Under the first prong of the Act’s definition of critical habitat, areas within the geographical area occupied by the species at the time it was listed are included in a critical habitat designation if they contain physical or biological features (1) which are essential to the conservation of the species and (2) which may require special management considerations or protection. For these areas, critical habitat designations identify, to the extent known using the best scientific and commercial data available, those physical or biological features that are essential to the conservation of the species (such as space, food, cover, and protected habitat). In identifying those physical or biological features that occur in specific occupied areas, we focus on the specific features that are essential to support the life-history needs of the species, including, but not limited to, water characteristics, soil type, geological features, prey, vegetation, symbiotic

species, or other features. A feature may be a single habitat characteristic or a more complex combination of habitat characteristics. Features may include habitat characteristics that support ephemeral or dynamic habitat conditions. Features may also be expressed in terms relating to principles of conservation biology, such as patch size, distribution distances, and connectivity.

Under the second prong of the Act's definition of critical habitat, we can designate critical habitat in areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. The implementing regulations at 50 CFR 424.12(b)(2) further delineate unoccupied critical habitat by setting out three specific parameters: (1) when designating critical habitat, the Secretary will first evaluate areas occupied by the species; (2) the Secretary will consider unoccupied areas to be essential only where a critical habitat designation limited to geographical areas occupied by the species would be inadequate to ensure the conservation of the species; and (3) for an unoccupied area to be considered essential, the Secretary must determine that there is a reasonable certainty both that the area will contribute to the conservation of the species and that the area contains one or more of those physical or biological features essential to the conservation of the species.

Section 4 of the Act requires that we designate critical habitat on the basis of the best scientific data available. Further, our Policy on Information Standards Under the Endangered Species Act (published in the *Federal Register* on July 1, 1994 (59 FR 34271)), the Information Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub. L. 106-554; H.R. 5658)), and our associated Information Quality Guidelines provide criteria, establish procedures, and provide guidance to ensure that our decisions are based on the best scientific data available. They require our biologists, to the extent consistent with the Act and with the

use of the best scientific data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat.

When we are determining which areas should be designated as critical habitat, our primary source of information is generally the information from the SSA report and information developed during the listing process for the species. Additional information sources may include any generalized conservation strategy, criteria, or outline that may have been developed for the species; the recovery plan for the species; articles in peer-reviewed journals; conservation plans developed by States and counties; scientific status surveys and studies; biological assessments; other unpublished materials; or experts' opinions or personal knowledge.

As the regulatory definition of "habitat" (50 CFR 424.02) reflects, habitat is dynamic, and species may move from one area to another over time. We recognize that critical habitat designated at a particular point in time may not include all of the habitat areas that we may later determine are necessary for the recovery of the species. For these reasons, a critical habitat designation does not signal that habitat outside the designated area is unimportant or may not be needed for recovery of the species. Areas that are important to the conservation of the species, both inside and outside the critical habitat designation, will continue to be subject to: (1) Conservation actions implemented under section 7(a)(1) of the Act; (2) regulatory protections afforded by the requirement in section 7(a)(2) of the Act for Federal agencies to ensure their actions are not likely to jeopardize the continued existence of any endangered or threatened species; and (3) the prohibitions found in section 9 of the Act. Federally funded or permitted projects affecting listed species outside their designated critical habitat areas may still result in jeopardy findings in some cases. These protections and conservation tools will continue to contribute to recovery of the species. Similarly, critical habitat designations made on the basis of the best available information at the time of designation will not control the

direction and substance of future recovery plans, HCPs, or other species conservation planning efforts if new information available at the time of those planning efforts calls for a different outcome.

Prudency Determination

Section 4(a)(3) of the Act, as amended, and implementing regulations (50 CFR 424.12) require that, to the maximum extent prudent and determinable, the Secretary shall designate critical habitat at the time the species is determined to be an endangered or threatened species. Our regulations (50 CFR 424.12(a)(1)) state that the Secretary may, but is not required to, determine that a designation would not be prudent in the following circumstances:

(i) The species is threatened by taking or other human activity and identification of critical habitat can be expected to increase the degree of such threat to the species;

(ii) The present or threatened destruction, modification, or curtailment of a species' habitat or range is not a threat to the species, or threats to the species' habitat stem solely from causes that cannot be addressed through management actions resulting from consultations under section 7(a)(2) of the Act;

(iii) Areas within the jurisdiction of the United States provide no more than negligible conservation value, if any, for a species occurring primarily outside the jurisdiction of the United States;

(iv) No areas meet the definition of critical habitat; or

(v) The Secretary otherwise determines that designation of critical habitat would not be prudent based on the best scientific data available.

As discussed earlier in this document, there is currently no imminent threat of collection or vandalism identified under Factor B for this species, and identification and mapping of critical habitat is not expected to initiate any such threat. In our SSA report and proposed listing determination for the cactus ferruginous pygmy-owl, we determined

that the present or threatened destruction, modification, or curtailment of habitat or range is a threat to cactus ferruginous pygmy-owl and that those threats in some way can be addressed by section 7(a)(2) consultation measures. Therefore, because none of the circumstances enumerated in our regulations at 50 CFR 424.12(a)(1) have been met and because the Secretary has not identified other circumstances for which this designation of critical habitat would be not prudent, we have determined that the designation of critical habitat is prudent for the cactus ferruginous pygmy-owl.

Critical Habitat Determinability

Having determined that designation is prudent, under section 4(a)(3) of the Act we must find whether critical habitat for the cactus ferruginous pygmy-owl is determinable. Our regulations at 50 CFR 424.12(a)(2) state that critical habitat is not determinable when one or both of the following situations exist:

- (i) Data sufficient to perform required analyses are lacking, or
- (ii) The biological needs of the species are not sufficiently well known to identify any area that meets the definition of “critical habitat.”

When critical habitat is not determinable, the Act allows the Service an additional year to publish a critical habitat designation (16 U.S.C. 1533(b)(6)(C)(ii)).

We reviewed the available information pertaining to the biological needs of the species and habitat characteristics where this species is located. Careful assessments of the economic and environmental impacts that may occur due to a critical habitat designation are not yet complete, and we are in the process of working with the States and other partners in acquiring the complex information needed to perform those assessments. The information sufficient to perform a required analysis of the impacts of the designation is lacking. Therefore, we conclude that the designation of critical habitat for the cactus ferruginous pygmy-owl is not determinable at this time. As mentioned

above, the Act allows the Service an additional year to publish a critical habitat designation that is not determinable at the time of listing (16 U.S.C. 1533(b)(6)(C)(ii)).

Required Determinations

Clarity of the Rule

We are required by Executive Orders 12866 and 12988 and by the Presidential Memorandum of June 1, 1998, to write all rules in plain language. This means that each rule we publish must:

- (1) Be logically organized;
- (2) Use the active voice to address readers directly;
- (3) Use clear language rather than jargon;
- (4) Be divided into short sections and sentences; and
- (5) Use lists and tables wherever possible.

If you feel that we have not met these requirements, send us comments by one of the methods listed in **ADDRESSES**. To better help us revise the rule, your comments should be as specific as possible. For example, you should tell us the numbers of the sections or paragraphs that are unclearly written, which sections or sentences are too long, the sections where you feel lists or tables would be useful, etc.

National Environmental Policy Act (42 U.S.C. 4321 et seq.)

It is our position that, outside the jurisdiction of the U.S. Court of Appeals for the Tenth Circuit, we do not need to prepare environmental analyses pursuant to the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq.*) in connection with regulations adopted pursuant to section 4(a) of the Act. We published a notice outlining our reasons for this determination in the *Federal Register* on October 25, 1983 (48 FR 49244). This position was upheld by the U.S. Court of Appeals for the Ninth Circuit (*Douglas County v. Babbitt*, 48 F.3d 1495 (9th Cir. 1995), cert. denied 516 U.S. 1042 (1996)).

Government-to-Government Relationship with Tribes

In accordance with the President's memorandum of April 29, 1994 (Government-to-Government Relations with Native American Tribal Governments; 59 FR 22951), Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments), and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. In accordance with Secretarial Order 3206 of June 5, 1997 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act), we readily acknowledge our responsibilities to work directly with Tribes in developing programs for healthy ecosystems, to acknowledge that Tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to Tribes.

We contacted the Ak Chin Indian Community, Apache Tribe of Oklahoma, Cocopah Indian Tribe, Comanche Nation, Gila River Indian Community, Hopi Tribe, Pascua Yaqui Tribe, San Carlos Apache Tribe, Salt River Pima-Maricopa Indian Community, Tohono O'odam Nation, Tonkawa Tribe of Indians, White Mountain Apache Tribe, Wichita and Affiliated Tribes, and Yavapai Apache Nation regarding the SSA process by mail and invited them to provide information and comments to inform the SSA. Our interactions with these Tribes are part of our government-to-government consultation with Tribes regarding the pygmy-owl and the Act. The Tohono O'odham Nation was invited to participate as a member of the SSA team because they have historically participated on issues related to the cactus ferruginous pygmy-owl and they have extensive acreage of pygmy-owl habitat. They accepted the invitation and have participated in development of the SSA, as well as with pygmy-owls surveys and monitoring. We will continue to work with Tribal entities during the rulemaking process.

References Cited

A complete list of references cited in this rulemaking is available on the Internet at <http://www.regulations.gov> and upon request from the Arizona Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this proposed rule are the staff members of the Fish and Wildlife Service's Species Assessment Team and the Arizona Ecological Services Field Office.

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Proposed Regulation Promulgation

Accordingly, we propose to amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17—ENDANGERED AND THREATENED WILDLIFE AND PLANTS

1. The authority citation for part 17 continues to read as follows:

AUTHORITY: 16 U.S.C. 1361–1407; 1531–1544; and 4201–4245, unless otherwise noted.

2. Amend § 17.11(h) by adding an entry for “Pygmy-owl, cactus ferruginous” to the List of Endangered and Threatened Wildlife, in alphabetical order under Birds, to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Common name	Scientific name	Where listed	Status	Listing citations and applicable rules
* * * * *				
BIRDS				

* * * * *				
Pygmy-owl, cactus ferruginous	<i>Glaucidium brasilianum cactorum</i>	Wherever found	T	[<i>Federal Register</i> citation when published as a final rule]; 50 CFR 17.41(l). ^{4d}
* * * * *				

3. As proposed to be amended at 83 FR 50560 (October 9, 2018), 85 FR 63474 (October 8, 2020), 86 FR 15855 (March 25, 2021), 86 FR 31668 (June 15, 2021), and 86 FR 41917 (August 4, 2021), § 17.41 is further amended by adding paragraph (l) to read as follows:

§ 17.41 Special rules—birds.

* * * * *

(l) Cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*). (1)

Prohibitions. The following prohibitions that apply to endangered wildlife also apply to cactus ferruginous pygmy-owl. Except as provided under paragraphs (l)(2) and (3) of this section and §§ 17.4, 17.5, and 17.7, it is unlawful for any person subject to the jurisdiction of the United States to commit, to attempt to commit, to solicit another to commit, or cause to be committed, any of the following acts in regard to this species:

(i) Import or export, as set forth at § 17.21(b) for endangered wildlife.

(ii) Take, as set forth at § 17.21(c)(1) for endangered wildlife.

(iii) Possession and other acts with unlawfully taken specimens, as set forth at § 17.21(d)(1) for endangered wildlife.

(iv) Interstate or foreign commerce in the course of commercial activity, as set forth at § 17.21(e) for endangered wildlife.

(v) Sale or offer for sale, as set forth at § 17.21(f) for endangered wildlife.

(2) *General exceptions from prohibitions.* In regard to this species, you may:

(i) Conduct activities as authorized by a permit under § 17.32.

(ii) Take, as set forth at § 17.21(c)(2) through (4) for endangered wildlife, and (c)(6) and (7) for endangered migratory birds.

(iii) Take as set forth at § 17.31(b).

(iv) Possess and engage in other acts with unlawfully taken wildlife, as set forth at § 17.21(d)(2) for endangered wildlife, and (d)(3) and (4) for endangered migratory birds.

(3) *Exceptions from prohibitions for specific types of incidental take.* You may take cactus ferruginous pygmy-owl while carrying out the following legally conducted activities in accordance with this paragraph (l)(3):

(i) Educational and outreach activities, provided the researcher already holds an appropriate, valid permit issued under part 21 of this chapter, which governs species protected under the Migratory Bird Treaty Act, for educational activities involving the use of live pygmy-owls, pygmy-owl skins, or parts of pygmy-owls or other raptors.

(ii) Habitat restoration and enhancement activities and projects that are approved by the Service prior to commencing work.

(A) These activities and projects may include activities that enhance cactus ferruginous pygmy-owl habitat conditions; improve habitat connectivity; increase availability of nest cavities; increase prey availability; reduce invasive, nonnative plant species; and enhance native plant communities, particularly woodland riparian communities.

(B) These activities and projects do not include prescribed fire within Sonoran Desert vegetation communities, any actions that would result in more than a minimal reduction or removal of tree cover (as determined by the Service), and actions that use or promote nonnative vegetation species.

(iii) For all forms of allowable take, reasonable care must be practiced to minimize the impacts from the actions. Reasonable care means:

(A) Limiting the impacts to cactus ferruginous pygmy-owl individuals and populations by complying with all applicable Federal, State, and Tribal regulations for the activity in question;

(B) Using methods and techniques that result in the least harm, injury, or death, as feasible;

(C) Undertaking activities at the least impactful times (e.g., conducting activities that might impact nesting cactus ferruginous pygmy-owls or nesting habitat only after nesting is concluded for the year) and locations, as feasible;

(D) Procuring and implementing technical assistance from a qualified biologist on projects regarding all methods prior to the implementation of those methods;

(E) Minimizing the number of individuals disturbed in the existing wild population;

(F) Implementing best management practices to ensure no diseases or parasites are introduced into existing cactus ferruginous pygmy-owl populations; and

(G) Preserving the genetic diversity of wild populations.

Martha Williams,

Principal Deputy Director,

Exercising the Delegated Authority of the Director,

U.S. Fish and Wildlife Service.